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VOL. XII NO. 1

UNITED STATES NAVAL
MEDICAL BULLETIN

PUBLISHED FOR THE

INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

ISSUED BY
THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT
DIVISION OF PUBLICATIONS
MEDICAL INSPECTOR J. S. TAYLOR, U. S. NAVY
IN CHARGE

JANUARY, 1918
(QUARTERLY)

WASHINGTON
GOVERNMENT PRINTING OFFICE
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NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

NOTE.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

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Volume I, No. 2, July, 1907.
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Volume IV, No. 2, April, 1910.
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Volume VIII, No. 3, July, 1914.
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PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the personnel of the Medical Department of the Navy in the performance of their duties, with the ultimate object that they may continue to advance in proficiency in respect to all of their responsibilities.

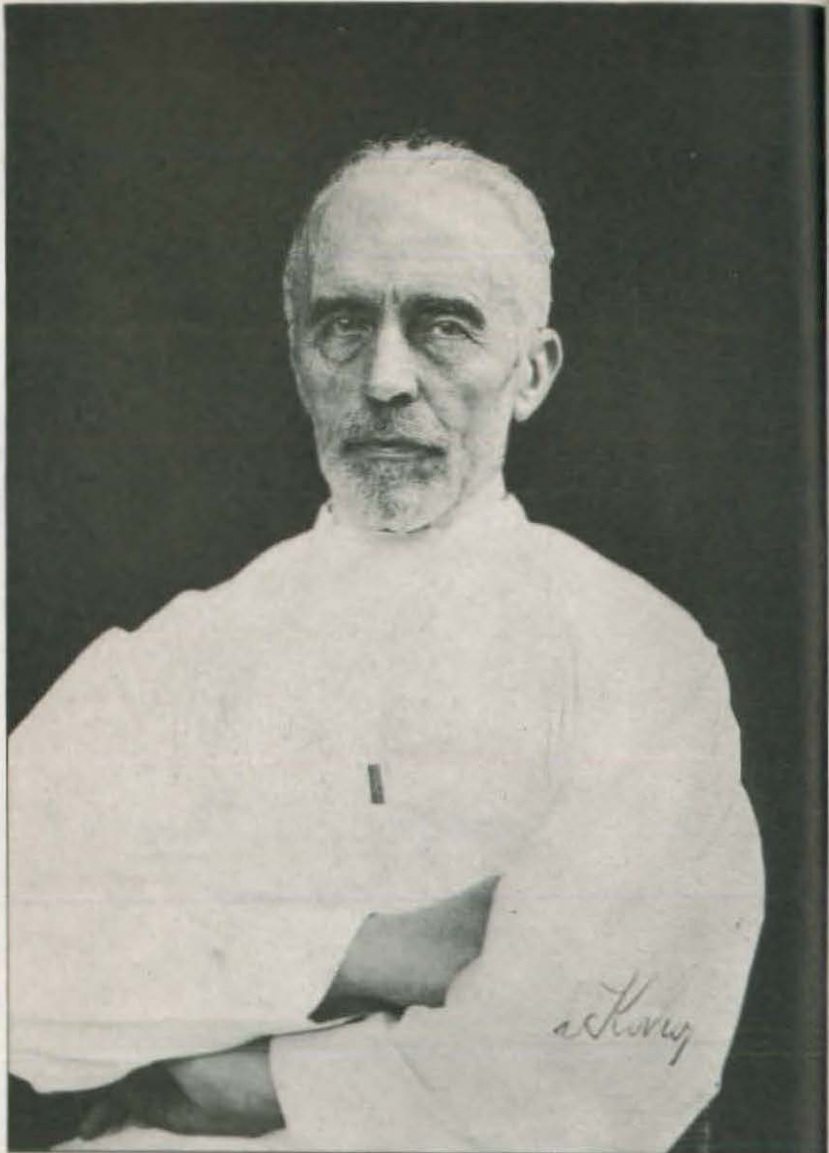
It is proposed that the NAVAL MEDICAL BULLETIN shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, dentistry, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part as extracts) throughout the service, not only will they be employed to some purpose as merited, but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Reviews of advances in medical sciences of special professional interest to the service, as published in foreign and home journals, will be given particular attention. While certain medical officers will regularly contribute to this work, it is urged that all others cooperate by submitting such abstracts from the literature as they may at any time deem appropriate.

Information received from all sources will be used, and the bureau extends an invitation to all officers to prepare and forward, with a view to publication, contributions on subjects relating to the profession in any of its allied branches. But it is to be understood that the bureau does not necessarily undertake to indorse all views and opinions expressed in these pages.

W. C. BRAISTED,
Surgeon General United States Navy.



Courtesy of Dr. Harvey Cushing.

THEODOR KOCHER, 1841-1917.

U. S. NAVAL MEDICAL BULLETIN.

VOL. XII. JANUARY, 1918. No. 1.

SPECIAL ARTICLES.

THE DANGERS OF INTRAVENOUS INJECTION OF ANTITYPHOID VACCINE.

By G. D. HALE, Passed Assistant Surgeon, and F. W. HARTMAN, Assistant Surgeon, United States Navy.

G. W. K. (C. C. M.) gave a history of a gonococcus infection of the urethra in 1911, which was apparently cured. Patient was admitted to the United States Naval Hospital, Newport, R. I., April 14, 1917, with a diagnosis of arthritis, chronic, left knee and ankles being involved. His trouble was not thought to be of venereal origin. Patient was given various antirheumatic treatments and improved to such an extent that he went on leave at the end of May, returning in good shape except for slight stiffness in ankles. On June 23, 1917, patient was found dead in a rooming house in Newport.

A board of inquest brought out the following facts: For about one month previous to his death, unknown to the hospital authorities, he had been under treatment by a local physician. The local physician stated that as a result of prostatic massage he discovered that the patient had a latent gonorrhea. The treatment he instituted and which he acknowledged was in the way of an experiment, although he gave as authority an article appearing in the Journal of the American Medical Association, was as follows: About June 15, the patient was given one-half c. c. of standard antityphoid vaccine intravenously (diluted), followed by marked reaction of short duration the principal feature of which was high fever. On the afternoon of June 23, 1917, a second injection was given, of a slightly increased amount, also diluted. Two hours later the woman in charge of the rooming house found the patient very ill, vomiting, and with a high fever. She called the physician in charge, but before his arrival, two hours later, the patient was dead, his death having occurred some four hours after the injection. Autopsy showed a markedly dilated right heart and congestion of both lungs. Although "dilatation acute cardiac" was given as the cause of death it is believed that some more scientific explanation could be found.

Since 1914 the intravenous injection of killed typhoid bacilli has been extensively used in the treatment of typhoid fever, and more recently as one of the agents in the nonspecific protein treatment of various conditions, especially gonorrheal rheumatism.

The reaction as described by Gay,[1] Miller,[2] Scully,[3] and others[4] consists of a severe chill, accompanied by headache, nausea, and vomiting, followed by high fever and a leucocytosis ranging from 15,000 to 100,000. The usual dosage in a debilitated patient[3] or a large dose administered accidentally[1] produce the more severe symptoms of anaphylactic shock, namely, urticaria, hemorrhages from the mucous membranes, dyspnea, cyanosis, rigor, dilatation of the heart, and general collapse.

The usual initial dosage is about 40,000,000 killed bacilli with subsequent dosage up to 150,000,000, although Gay has used the equivalent of 300,000,000 bacilli in sensitized vaccine sediment as an initial dose and increased amounts subsequently. All workers agree that the first injection should consist of a small number of bacilli, allowing the size of further dosage to be governed by the severity of the reaction resulting from the first administration.

In this case it will be noted that one-half c. c. of standard typhoid vaccine or 500,000,000 bacilli with no special method of preparation was given intravenously, resulting in a marked reaction, one manifestation of which was a high fever. Then, seven days later, at the height of sensitization, a second dose even larger than the first was given. Thus over three times the maximum dose ordinarily used was given at the first injection, and four (probably more) times the maximum dose was given the second time, resulting in the typical symptoms of anaphylactic shock with death four hours later. The autopsy findings also correspond with those described in the experimental anaphylaxis of animals.

This method of treatment, though regarded as harmless by most workers, has been considered dangerous by Sladek and Kotlowski, and numerous alarming reactions of short duration have been reported. Scully[3] reports one case of death in an alcoholic three and one-half days after a small dose of typhoid vaccine intravenously, and advises us of two other cases dying after antimeningococcus serum; one, an arthritic, died from acute dilatation of the stomach, and the second, a typhoid case, from epistaxis and intestinal hemorrhage. Sladek and Kotlowski,[5] Eggerth,[6] and Biedl[7] report four cases of death from intestinal hemorrhage and uncontrollable epistaxis after comparatively small doses of intravenous typhoid vaccine.

Search of the literature has failed thus far to reveal a single anaphylactic shock with fatality directly attributed to the intravenous injection of typhoid vaccine. The administration, however, has usually been in the hands of cautious, experienced men working in large clinics, where all aspects of the treatment are considered and controlled. This case plainly shows that the treatment is dangerous, that the first dose should be small and subsequent doses measured by the reaction of the patient to the first dose, and, finally, that the patient should be under close observation until the period during which anaphylactic shock may occur is surely over.

---

[1] Frederick P. Gay: J. Lab. and Clin. M., St. Louis, 1915, 1, p. 13.

[2] Miller: Jour. Am. Med. Assn., Vol. XLIX, 1917, p. 765.

[3] Scully: Jour. Am. Med. Assn., Vol. XLIX, 1917, p. 20.

[4] Kibler and McBride: Jour. Infect. Dis., vol. 21, 1917, p. 13.

[5] Sladek and Kotlowski: Wien. klin. Wchnschr., 1915, 28, 389.

[6] Eggerth: Wien. klin. Wchnschr., 1915, 28, 209.

[7] Biedl, A.: Prag. Med. Wchnschr., 1915, 40, 53.

TREATMENT OF FRACTURES OF THE THIGH BY THE GASSETTE APPARATUS.

By GASTON HOUZEL, Médecin Aide Major 1^{re} classe.[1]

[Published by the War Department of the French Republic.]

The principle of this apparatus for fractures of the thigh can be summed up in two words—traction, suspension. When employed conjointly these two conditions afford a solution to the problem of treating a war wound without interfering with the immobilization of the fragments. It is applicable, therefore, to all fractures of the femur, but is particularly noteworthy in war traumatisms for posterior lacerated wounds, which undergo daily inspection and irrigation. It is the only method by which a high fracture of the subtrochanteric type is easily treated.

DESCRIPTION OF THE APPARATUS.

It consists of:

1. A frame for suspension and traction.
2. An anterior suspension-cradle splint.
3. The necessary extension devices.

1. THE TRACTION-SUSPENSION FRAME.

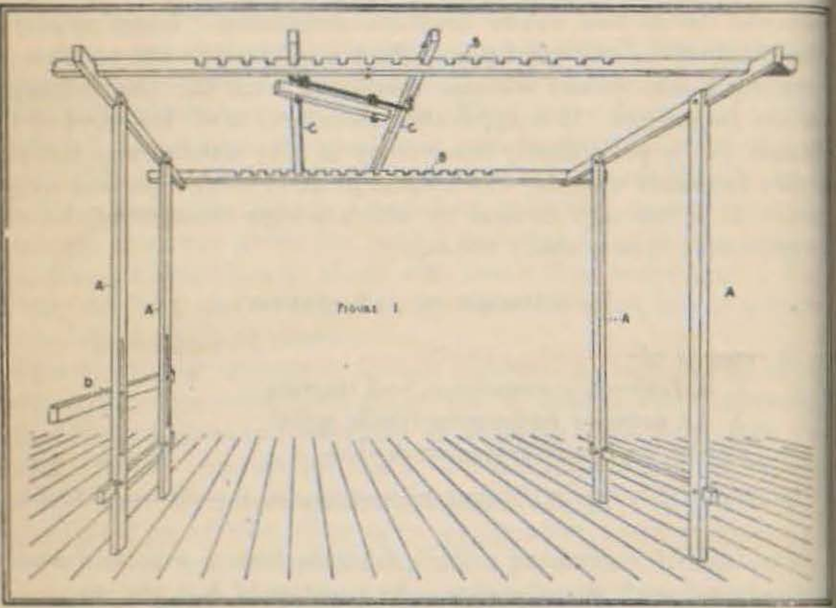
The idea of suspending a thigh fracture from a wooden frame is not original with Miss Gassette. As a matter of fact, the suspension trestle is the work of the British, who had already employed it in their hospitals long before the present war. The idea of suspending a thigh fracture belongs to them; an improved suspension from a trolley playing by two rollers on a wooden crosspiece was used in France more especially by Surgeon H. H. M. Lyle at the Jenilly Ambulance (Dammartin).

Miss Gassette sought particularly in her model of a frame to produce a suspension device which would be available for all cases, whether of the upper or lower limb, a universal suspension which could be constructed with little material, at small expense and which, through its very simplicity, would perform very efficient service.

---

[1] Translated by Medical Inspector J. S. Taylor, United States Navy.

The frame is composed of 14 parts, including the trolley (fig. 1). Let us take four uprights (*A*, fig. 1), secured to each other in pair by transverse bars at top and bottom, securely bolted in place. The two squares thus formed are fastened to each other by two pieces of wood (*B*, fig. 1) as long as the bed, marked along their upper surfaces by a series of notches which receive and hold transverse crossbars. The latter (*C*, fig. 1), essential features of the structure to which the rail of the trolley is to be fastened by two large eyebolts, extend beyond the square of the frame. At the foot of the bed a third crosspiece (*D*, fig. 1) secured by bolts likewise projects beyond the frame, and these three crosspieces by being longer than the width of the bed permit the use of marked abduction of thigh or arm.



Traction-suspension frame.

II. THE ANTERIOR SUSPENSION-CRADLE SPLINT.

This is the wholly original feature of the device. It is the discovery which gives the apparatus its unquestionable superiority over all others. As a matter of fact, the immobilization of a fracture by means of a frame was originally obtained by a posterior metallic splint with or without a hinge at the level of the knee joint.

At the outbreak of the war Dr. Frank Gardner, modifying the Thomas apparatus, had in Dr. Blake's surgical service applied the principle of a posterior apparatus hung from a trestle. After a prolonged study of the question Miss Gassette, who had acquired wide experience through her position as technical director of the Franco-American Committee Against Functional Loss of Power, was in a position to appreciate that this posterior splint was a source of pain to the wounded, especially in cases of subtrochanteric fracture. The suspension in these cases gradually induced an intolerable pressure from the metal frame upon the soft parts, especially at the gluteal fold, impairing the skin and liable to cause a slough.

Her idea was to turn this posterior splint around and swing the limb in a cradle to an anterior leg-thigh frame (fig. 2), to which would be secured the bands supporting the fractured limb. In this way the suspension would be lashed to this rigid frame, which could even serve as a means of transportation by the aid of a few circular plaster of Paris bandages. This is actually the chief feature of the device, and we owe this happy modification to Miss Gassette, who has simply brought up to date an anterior metal frame which the American surgeon Hodgens employed in 1863–1865 in caring for the wounded of the War of Secession.

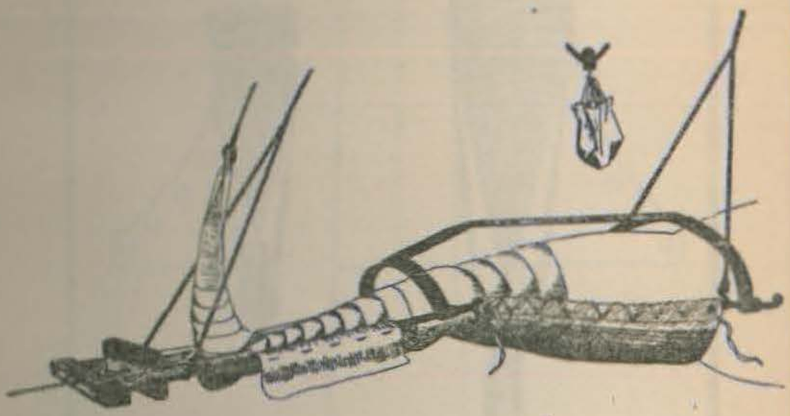


FIGURE 2

Suspension-cradle splint.

This anterior suspension-cradle splint swings from the crosspieces of the trestle by two sets of cord, which, running over the traveling pulley, reach a system of counterweights represented by a canvas bag, into which sandbags weighing 1 kilo each are to be placed.

Furthermore, the splint at its distal extremity is terminated by a wooden crosspiece with a central perforation for the traction cord. Finally there is a wooden block, which, by Miss Gassette's arrangement, serves as an intermediate element to which are buckled and secured the extension bands.

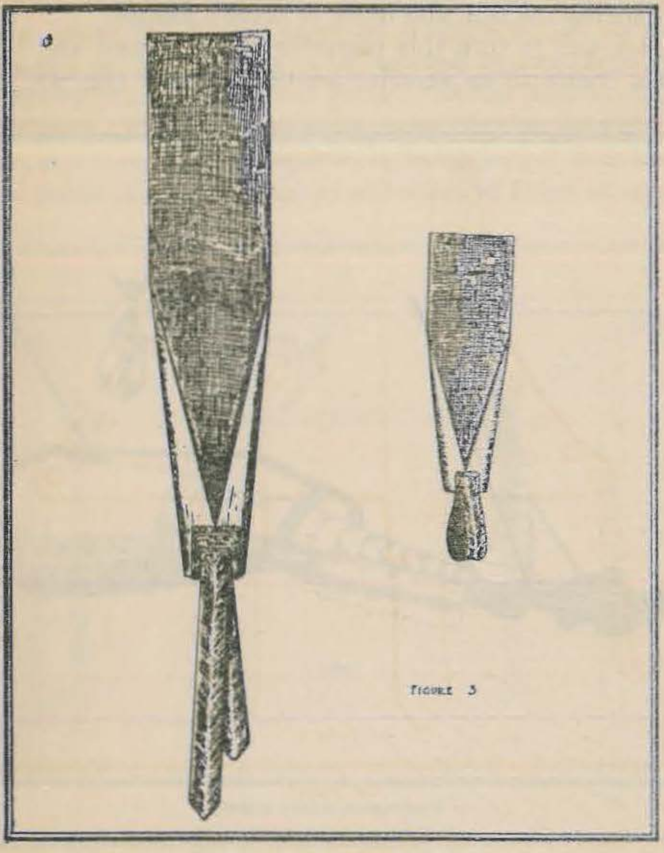


FIGURE 3

Extension device.

III. EXTENSION DEVICE.

This device constitutes one of the novel and interesting features of the apparatus. Up to Miss Gassette's time we used mainly adhesive bandages put on like the old diachylon of Tillaux. These had their disadvantages as regards the skin, were not available where there existed skin lesions of the leg, and, besides, had a tendency to become loose where such prolonged treatment was demanded. In the type which we are describing here extension can be made in two ways. The commonest and best way is to use a form of lint bandage (*finette*) such as Blake adopted from the start. This material has a fluffy nap which is very strong. It is to be cut in pieces 0.60 centimeter long and 0.25 centimeter wide. These bands narrow toward their extremities and end on each side in two straps (2 fingers' breadth wide), one of which goes to the intermediate board, the other being secured to the suspension splint (figs. 3 and 6). These bands, easy to put on and shaping themselves to the limb which they surround by imbricating their front and back edges, are made adherent to the skin along the length of the limb by a special glue called Heussner's glue or paste, of which the following is the composition:

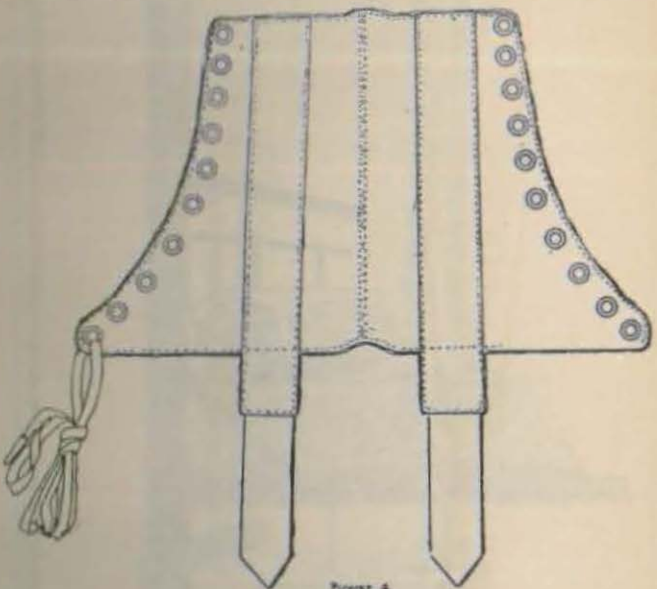


FIGURE 4

The gaiter.

Rosin	60
Alcohol	50
Benzine	25
Venice turpentine	5

Where there are complicating wounds of the leg, one simply cuts windows in the strips of lint through which dressings can be done. On the other hand, if the wounds are of considerable extent the strips can be replaced by another method of extension, namely, the gaiter (fig. 4), which envelops the foot and, like Ombredanne's boot, is laced up in front along the median line.

METHOD OF EMPLOYING THE APPARATUS.

I. SETTING UP THE FRAME.

Before any actual handling of the thigh, set up the wooden frame, one section at the head and one at the foot of the bed, firmly tied with rope, and unite them to each other by the two bars which complete the frame. The three crossbars (*C* and *D*, fig. 1) are put on last of all. Remember to raise the foot of the bed with stout wooden blocks about 25 centimeters high.

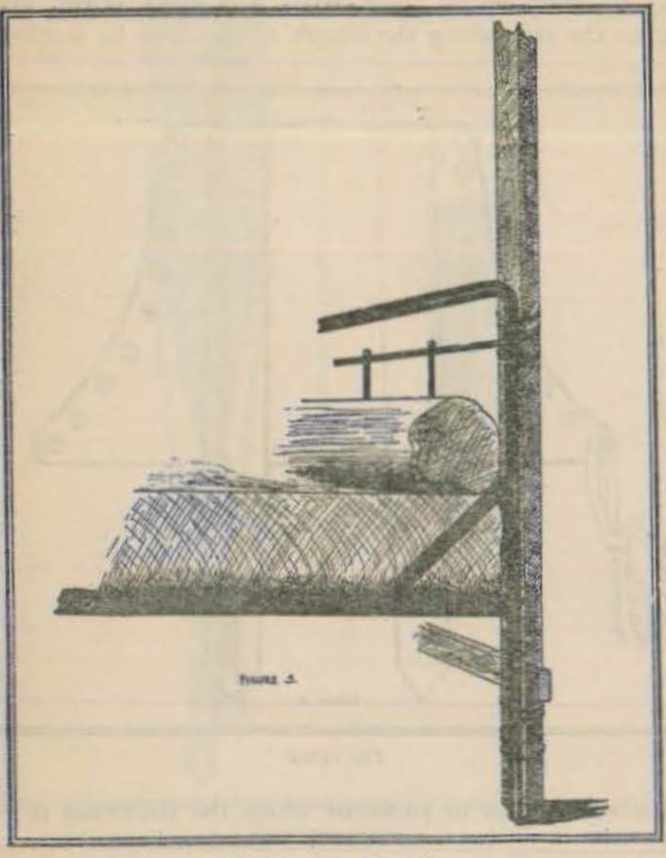


FIGURE 3.

Frame secured to bed.

II. APPLICATION OF THE EXTENSION AND SUSPENSION DEVICE.

(*a*) Extension will usually be made, as we have said, by bands of lint put on with the fluffy side next to the skin.

Raise the leg; scrub the limb with soap and water and a brush; go over the skin with ether or alcohol and then with a large brush spread the Heussner paste on smoothly. Apply the lint strips, imbricating their edges front and back, and remembering an important point, to prevent their adhering at the level of the malleoli, for sloughing will inevitably result from deterioration of the skin subjected to constant traction over the bony layer directly beneath it. The greater portion of the surface of the limb will be covered in to a point a little above the upper limit of the lower fragment. At the foot the two strips are separated from each other by the width of the intermediate wood piece, to which are fastened two of the extension straps. The other two are fastened to the crosspiece of the splint (fig. 6).

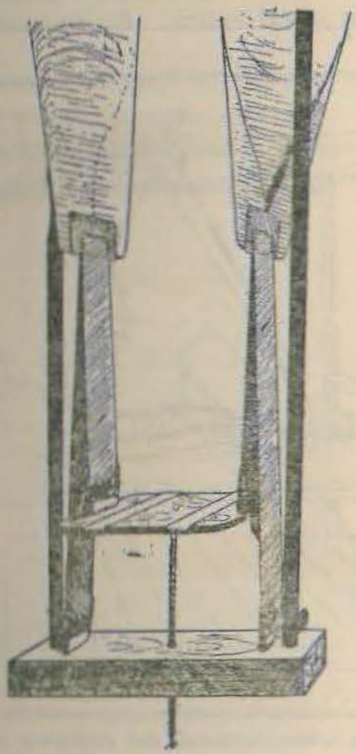


FIGURE 6

Crosspiece and intermediate wood piece.

When the strips are in place the leg is surrounded by a soft bandage of some crêpelike material, which secures intimate contact during the drying period. Besides this it is absolutely necessary to wait at least an hour before beginning the extension. It is advisable therefore to let the latter step be contemporaneous with the last operative procedures and to take advantage of the anæsthesia to complete t extension, which is always painful at the moment when the leg immobilized to put on the bandages.

(*b*) Suspension, on the other hand, can only be applied when t patient is in the bed. The splint is placed above the limb while und the limb are slipped the suspension bands. These will consist for t leg of rather long compresses or a sheet of lint secured with pins each side of the splint. For the thigh Miss Gassette employs a cradl of a single piece of material containing some rubber reinforced its long diameter by whalebone and at the sides secured by lacings the two rods of the metal splint. By unlacing one side of th

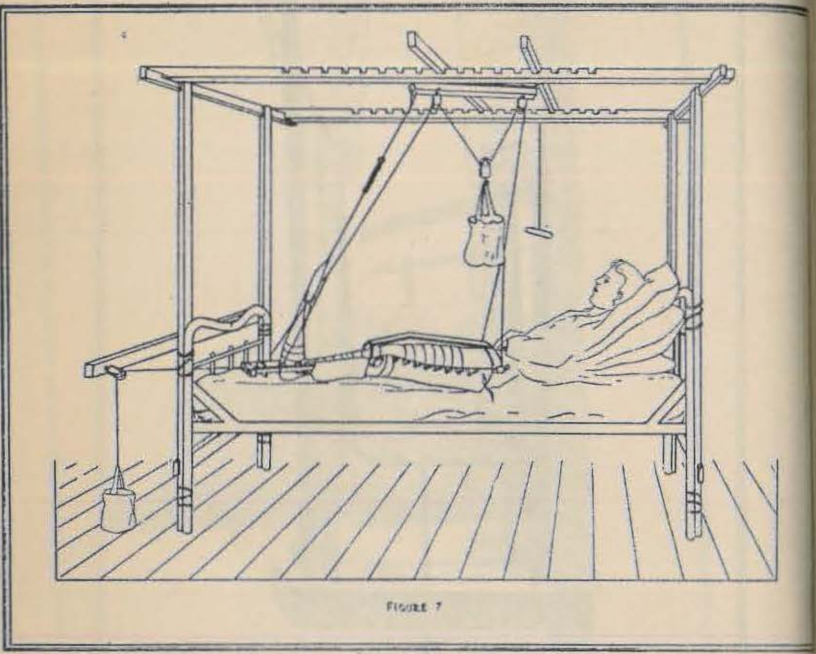


FIGURE 7

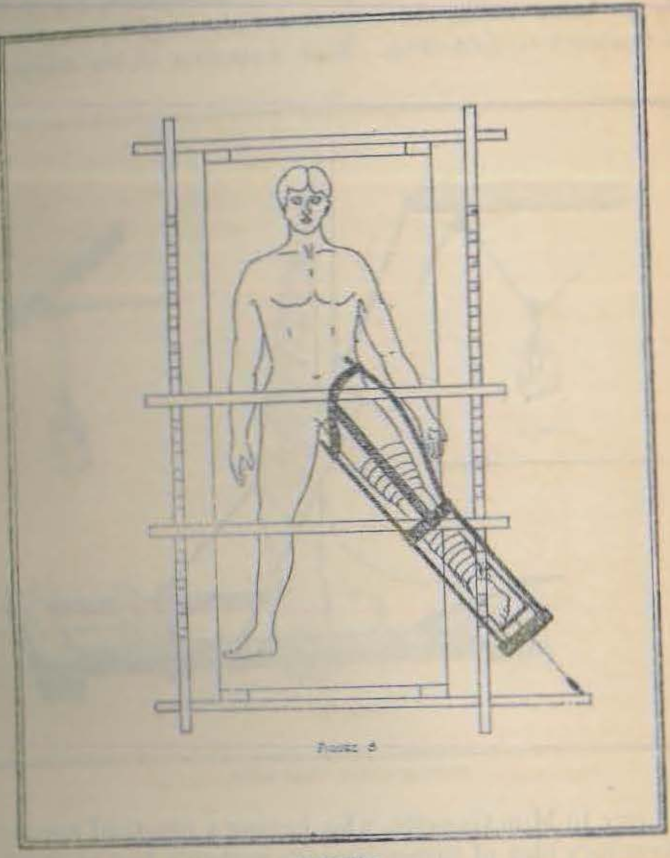
Extension, counter-extension, and suspension complete.

cradle without disturbing the traction one has surgical access to th whole posterior of a thigh absolutely immobilized even during th course of the most complicated dressing.

To complete the installation of the suspension apparatus tractio must be instituted at once. The strips are buckled to the intermediate board, and the traction cord passes through the foot of th apparatus and runs to its pulley. The latter is secured on the crossbar of the frame (fig. 7) more or less in abduction, according to th height of the level of the fracture. The traction cord turns over th pulley and ends in a canvas bag, in which is to be placed a weight o

6 to 15 kilos, according to the clinical features of the case and the age and especially the muscular development of the patient.

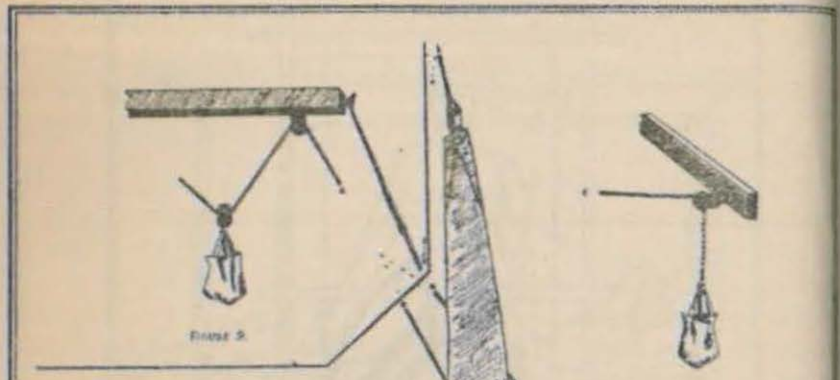
As for the suspension, properly so-called, it requires the most careful adjustment of the two transverse bars of the trestle. They must be so placed as to allow the trolley to travel parallel to the principal axis of the limb, and the higher up the seat of the fracture the nearer the head of the bed must the trolley be moved so as to obtain more counter-extension. The two eyebolts for the attachment of the trolley, each on its own transverse bar, determine the degree of abduction of the limb.



Abduction.

Having fixed the trolley, screw in an eyebolt at 0.10 centimeter from each end of the wooden bar which it supports, fasten a pulley to each end, and, securing the cradle splint by two cords, one the upper crural, the other the lower leg cord, which a little adhesive material will secure to its hooks of attachment, have the two cords pass through their respective pulleys in the trolley. They should meet and be spliced into one cord to support a counterweight repr sented by a canvas bag, which a traveling pulley will always mai tain in an intermediate position between the two forces acting i oposite directions (fig. 9). For actual counterweight use from 6 to kilos and by experiment obtain a state of equilibrium such that th leg shall occupy a horizontal plane slightly lower than that whic traverses the traction pulley, for otherwise the extension will b defective.

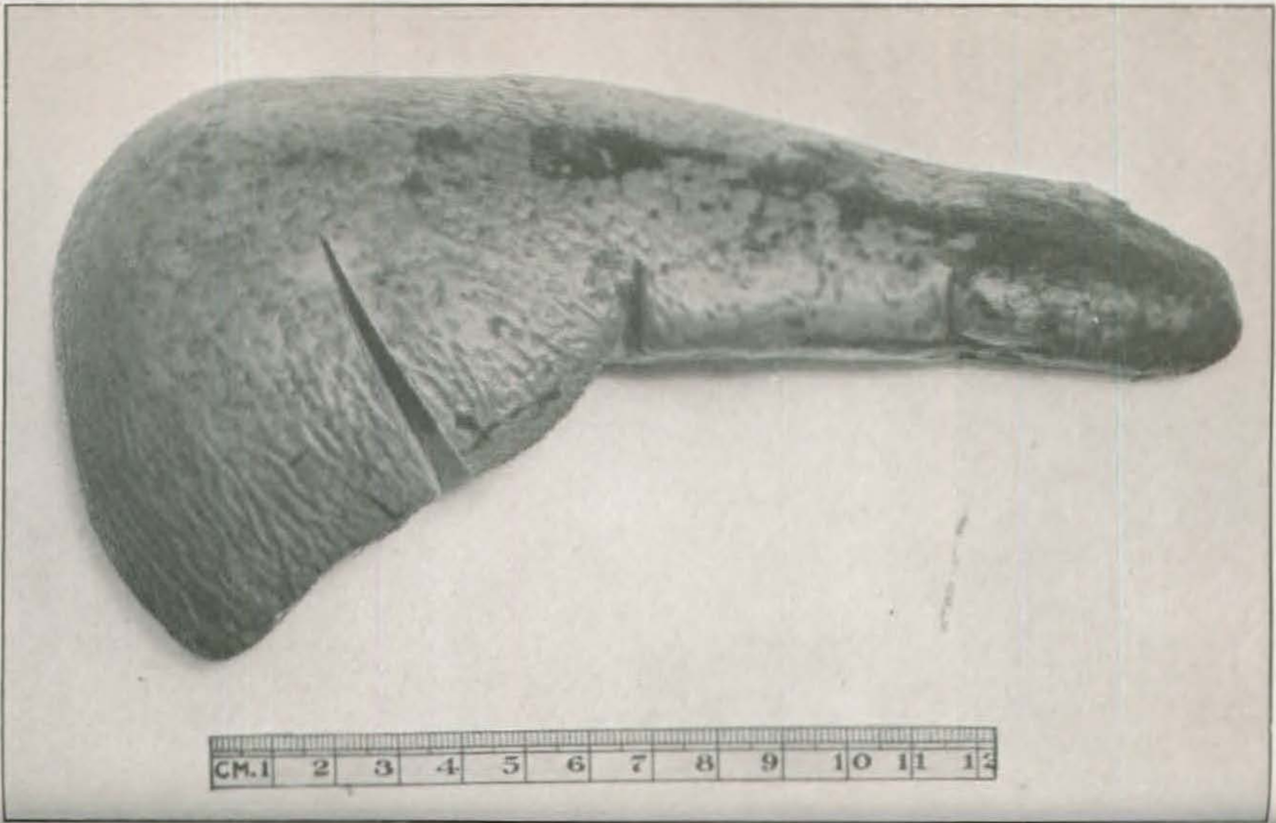
But the apparatus thus set up is still incomplete, for it does no provide for maintaining the foot at a right angle, so as to counter act the tendency to foot-drop. This is another of the improvement



Extension and suspension.

which we owe to Miss Gassette, who, having a practical appreciati of Dr. Keating's idea of suspending the patient's foot to the trolle has enabled us to combat successfully this great stumbling block i the treatment of fractures of the thigh by continuous extension. Th first step toward avoiding the equinus position was to employ a righ angle iron wire. Then, a spring device of the Harley type was use The simplest plan is to fasten a band to the plantar surface wit Heussner's glue and suspend it from an eyebolt screwed into the en of the wooden bar which carries the trolley (figs. 7 and 10).

This apparatus thus installed has only good points and furnishe a means of complete and continuous extension, thanks to the suspen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sion, which avoids the clinging to the plane of the bed and the consequent reduction of traction in the ordinary linear devices of the Tillaux type. The traction is continuous, because the arrangement allows wounds to be dressed and the patient to be cleaned and bathed at the same time, while sloughing is prevented. By means of a small wooden billet suspended from the trestle for the patient to grasp, he can lift himself and is thus able to endure more easily the months of immobilization demanded by his injury.

We have shown in the above description that this apparatus resulted from the combined efforts of several English and American surgeons whose sagacity and inventiveness long ago attacked the problem of treating complicated fractures of the thigh, but it is first and foremost the work of Miss Gassette, who, by hitting upon the scheme of a suspensory trestle, of a counterweight, of an anterior suspension-cradle splint, of extension, has made this apparatus peculiarly her own and produced an arrangement which comes very near being perfect.

For 18 months the Gassette pattern has been used by our forces and has stood the test, and now positive results testify to its value. It is in daily use in the surgical service of Cochen, and it is to express the highest appreciation of its efficiency that we here summarize its merits by quoting the opinion of Professor Quenn, who considers it unquestionably superior in every way to all other devices for the treatment of compound fractures of the thigh.

A PATHOLOGICAL STUDY OF SPLENIC ANEMIA (BANTI'S DISEASE).

By F. W. HARTMAN, Assistant Surgeon, United States Navy.

R. S., age 24, private, U. S. M. C., was admitted to the United States Naval Hospital, Washington, D. C., July 20, 1917, with diagnosis undetermined. There was nothing remarkable in the family history. The personal history was negative except for a chancroid in October, 1914. The patient's illness dates back to November, 1914, while on duty in Mexico. The constant complaint from that time was of pain and discomfort in the epigastrium and right upper quadrant. This was always associated with nausea, vomiting, diarrhea, and irregular fever. Of the 32 months' illness approximately 16 months had been spent in different hospitals. The patient underwent a cholecystostomy with three weeks' drainage, followed by an operation for ventral hernia, in 1915. In 1916 he was given a diagnosis of typhoid fever, but after four months there was only slight change in his condition. During this period he was told that he probably had a liver abscess, as both his liver and spleen were enlarged.

On admission here the patient's trouble, as he stated it, consisted of "weakness, pain in the stomach, loss of appetite, and diarrhea." There was an irregular fever, usually rising in the afternoon or early evening, going as high as 103 F. at times.

Physical examination.—The patient was very thin, and his face had a pinched expression. Weakness and malaise were very evident. The complexion had a yellowish tint, and the conjunctivae were slightly jaundiced. The teeth were in good repair, containing numerous fillings and crowns.

Thorax.—Heart; cardiac dullness normal size. There were no thrills or murmurs.

Lungs; resonant throughout, no râles.

Abdomen.—There was some rigidity of the abdominal muscles with pain on deep pressure over the epigastrium. The liver dullness extended from the third interspace to 4 centimeters below the costal margin on the right side.

The spleen was easily felt rising and falling with respiration as a firm rounded mass reaching 7 centimeters below the costal margin during full inspiration.

Genito-urinary system.—Negative.

Glands.—There was no general or local glandular enlargement.

Sputum.—Negative for tubercle bacilli.

Urine.—Small amount of albumen, a few hyaline and granular casts.

Wassermann.—Negative.

Blood.—Previous to operation the hemoglobin per cent as estimated by the Tallquist method averaged about 75. The red count varied from 3,700,000 to 4,500,000 and the white count ranged from 4,000 to 4,600. Differential count of 200 cells:

	Per cent.
Lymphocytes	23
Large mononuclears and transitionals	8.5
Polymorphonuclear leucocytes	64
Eosinophiles	2
Mast cells	1
Myelocytes	1
Blasts	.5
	100

In addition to the moderate anemia, leucopenia, and relative lymphocytosis, many of the polymorphonuclear leucocytes showed a dense granulation, which tended to be basophilic, and band-form nuclei, and there was 1 per cent of typical myelocytes and a few very large mononuclear cells with blue staining vacuolated protoplasm and lighter staining nucleus.

X-ray.—The picture of the chest showed nothing pathological. As seen in plate No. 2, the spleen threw a remarkable shadow, com-

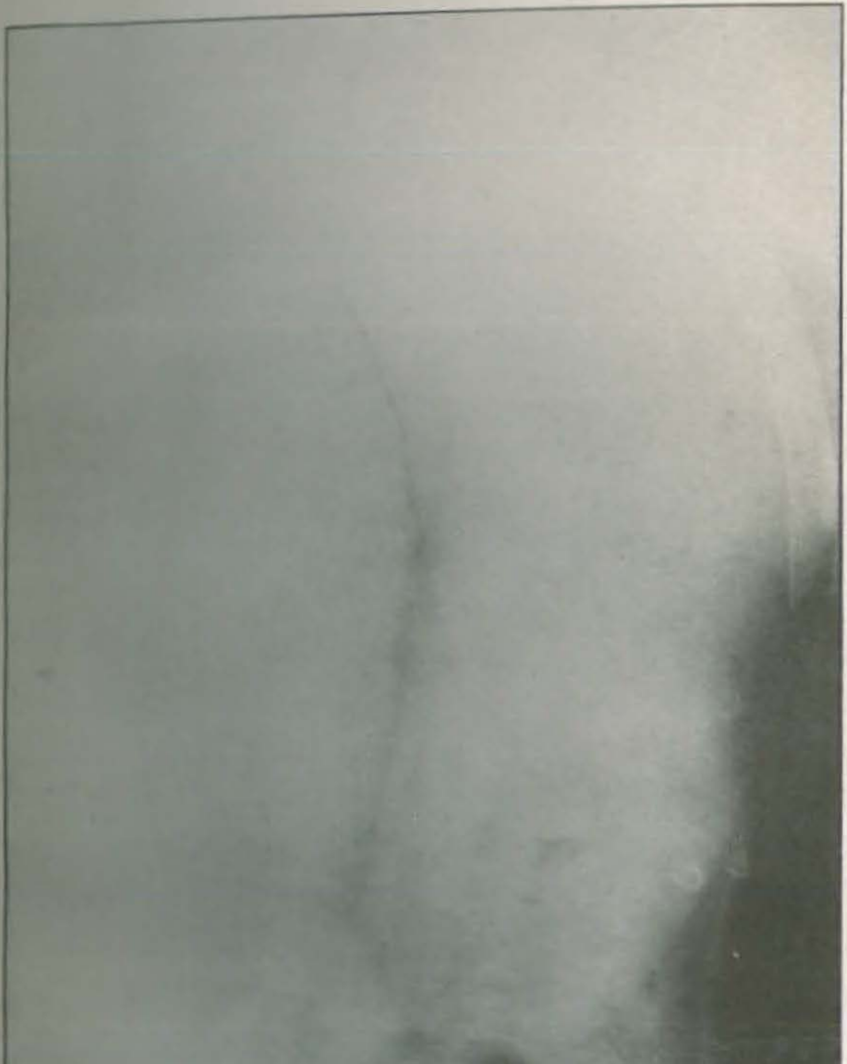

PLATE 2.

Hartman—Splenic Anemia.

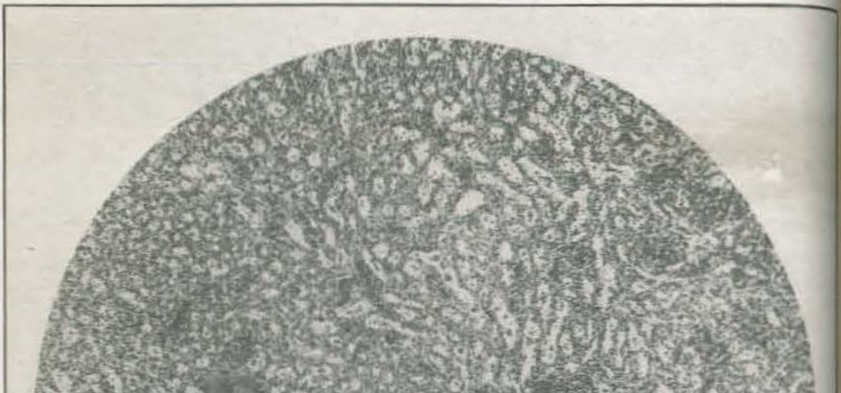

PLATE 3.

parable only to that thrown by a chronic malarial spleen. Lack of contrast makes it impossible to reproduce the picture perfectly, but the outlines are plainly seen, which correspond to those of the specimen. In good light curved lines are seen running from the large upper pole to the more pointed lower pole. Failing to see these lines might lead to the diagnosis of enlarged kidney, as the lower pole is at about the level of the kidney, though much too far from the median line.

Splenectomy was undertaken with some misgiving owing to the huge size of the spleen and the poor condition of the patient. After safeguarding his patient with four hours' continuous proctoclysis of sodium bicarbonate and glucose, Surgeon H. F. Strine, United States Navy, opened the abdomen, finding the spleen largely above the costal margin, adherent to the diaphragm and the pancreas. Many of these adhesions carried large accessory veins to the spleen. The liver edge was rounded, firm, and elastic. The difficult task of clamping the vessels and delivering the spleen was completed with dispatch.

Although there was considerable operative shock, the patient reacted rapidly. Blood examination 24 hours after operation was as follows: Hemoglobin 65 per cent, white cell count 12,500, red cell count 3,525,000. Differential count:

	Per cent.
Polymorphonuclear leucocytes	80
Lymphocytes	11
Eosinophiles	1
Mast cells	1
Blasts	1
	94

The post operative course was complicated by pneumonia on the third day, which undoubtedly played a part in sending the white count to 22,200 and the polymorphonuclear per cent to 81; however, the white count remained above 16,000 for 10 days, then gradually fell to 14,000, where it remained until he left the hospital on furlough. Sixteen days after operation the hemoglobin per cent was 80, red count 4,500,000, white count 14,200. Differential count:

	Per cent.
Polymorphonuclear leucocytes	69
Lymphocytes	14
Large mononuclears and transitionals	6
Eosinophiles	4
Mast cells	3
	96

Numerous atypical leucocytes with band-form nuclei and heavy granules were seen at this time, but no typical myelocytes. Attention is called to the increase in eosinophiles and mast cells.

The specimen consists of a spleen about five times the normal size, measuring 18½ by 11 by 8½ centimeters and weighing 732 grams. The capsule is smooth except for a few wrinkles. Several large hemorrhagic areas appear just beneath the capsule. Near the hilus is a small section of adherent pancreas and several accessory veins enter the upper pole. Two deep notches cut the anterior border (pl. 1). In consistency it resembles a solid rubber ball being firm and markedly resilient.

On section the surface has the peculiar smoothness of a compact fibrous tissue. The edges of the sections are sharp and well defined; the blood vessels are gaping, as in a liver section; and the color is a grayish red. In the fresh specimen neither the trabeculae nor the malphigian corpuscles are seen, but in the preserved specimen the latter are seen as lighter gray dots, which in some areas are surrounded by a narrow zone of reddish brown tissue.

Miscroscopic.—As seen in plates Nos. 3 and 4, the tissue is scarcely recognizable as spleen. The capsule is thickened, some areas being infiltrated with blood cells. Large blood spaces walled by comparatively dense fibrous tissue and lined by endothelial cells, many of which have broken away, replace the normal adenoid tissue. The malphigian corpuscles show only loosely placed lymphocytes at the periphery with marked fibrosis at the center (pl. No. 4). The trabeculæ are relatively few in number, but thicker than normal. The picture is thus one of hyperplasia of the reticulum at the expense of the lymphoid elements of the spleen. It would appear that the function of the spleen is interfered with, as there is no phagocytosis of red blood cells or blood pigment.

Now, two months and a half after operation, the patient returns free from all his former symptoms. His appetite is excellent and he has gained 20 pounds in weight. He is still pale, but the mucous membranes have a good color. Blood examination: Hæmoglobin, per cent 90; white cell count, 12,800; red cell count, 4,900,000. Differential count:

	Per cent.
Polymorphonuclear leucocytes	65
Lymphocytes	20
Large mononuclears and transitionals	5
Eosinophiles	9
Mast cells	1
	100

There are many band-form nuclei in the polymorphonuclears with dense granulation of the protoplasm. Most of the lymphocytes are of the large type and the protoplasm containing no granules stains a steel blue. Increasing eosinophilia with continued leucocytosis is striking. However, these are the usual blood changes following splenectomy.

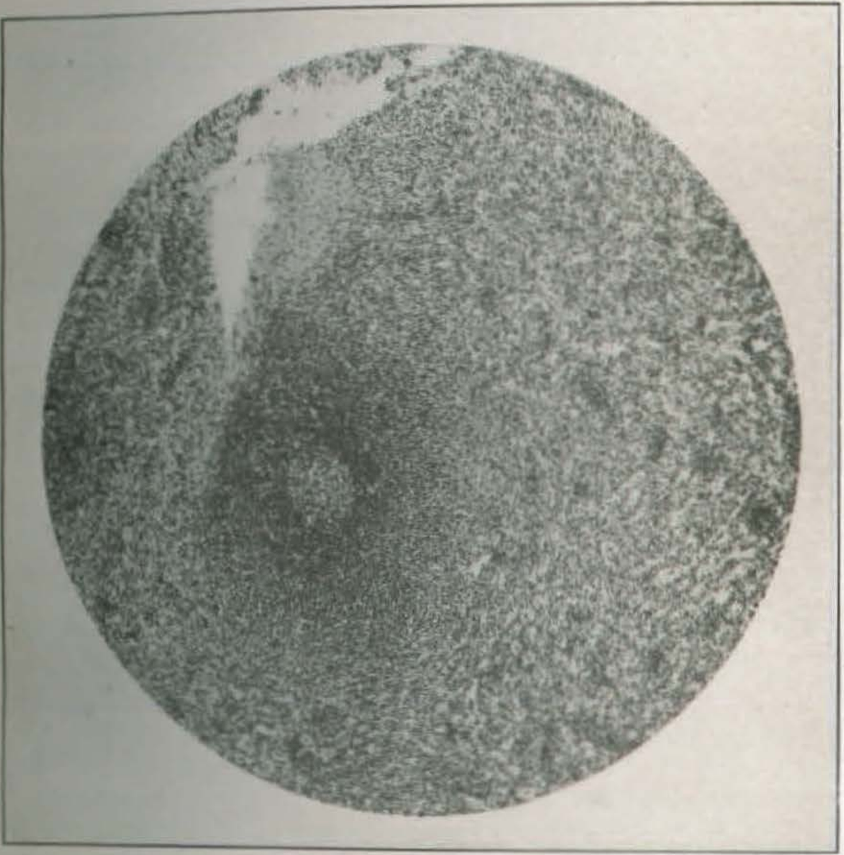

PLATE 4.

The interest in this case centers first about the unvaried set of symptoms extending throughout the disease and the difficulty of the interpretation of these symptoms. With the fibrous perisplenitis found at operation and the complete recovery after operation it would seem that the symptoms were the result of adhesions to and pressure upon adjacent viscera and the diaphragm.

Second. Blood changes before operation, which have been often described with Banti's disease though not universally accepted as diagnostic of the condition and changes after operation well recognized as the result of splenectomy.

Third. The clearness with which the spleen shows in the X-ray picture, although this is not remarkable when we consider the fibrous structure of the organ and the large amount of blood contained in its dilated sinuses. X-ray examination may prove to be a valuable aid in the diagnosis of this disease.

Fourth. The gross and microscopic pathology is an intensified picture of that commonly reported in Banti's disease. Seldom has the pathology proven such a distinct entity as in this case.

THE CARE OF CONTAGIOUS CASES AND THEIR IMPORTANCE TO THE UNITED STATES NAVY.

By M. F. GATES, Medical Director, United States Navy.

Through the courtesy of Dr. D. L. Richardson, superintendent of the Providence City Hospital, several medical officers and nurses of the staff of the United States Naval Hospital, Newport, R. I., have been given opportunities to study the work, and by authority of the Surgeon General seven nurses have served tours of duty of two weeks each in the actual care of patients in that hospital. It is believed that this experience will be of great value to the Navy.

The fundamental idea which governs the care of contagious cases is definite and the technique is simple and easily understood, but for its efficient carrying out it requires certain special facilities and extremely conscientious execution by all who come in contact with patients. The technique is based on the principle that contagions are rarely, if ever, air borne, but that transmission is by contact, directly or indirectly. The importance of this and its logical conclusions is certainly not generally appreciated by physicians, either civil or military.

It may be of value to exemplify from recent experience at this hospital the cost to the service in morbidity and mortality of infections, and it is believed that this experience will be emphasized by that of others. During the first seven months of the current year admissions to this hospital numbered 1,529, and of these 802 were due to the following-named diseases: German measles, measles, mumps, chicken-pox, scarlet fever, diphtheria, cerebro-spinal meningitis, pneumonia (lobar and broncho-), and suppurative pleurisy.

During that period 47 deaths occurred, the causes being as follows:

Cerebro-spinal meningitis	2	Wound, gunshot	1
Pneumonia, lobar	18	Appendicitis	1
Pneumonia, broncho-	13	Cardiac dilatation, acute	1
Pleurisy, suppurative	10		
Tuberculosis, pulmonary	1		47

Out of the 47 deaths 44 were due to infectious diseases. In 18 the fatal illness followed, and in most of them was distinctly a sequel to diseases too often very lightly considered, measles and German measles. Cases of German measles have for some reason been unusually severe, and many patients who did not develop sequelæ have been extremely ill.

A more thorough appreciation of the lessons taught by such experience must lead to improvement of technique in handling cases and especially to increase at naval hospitals and elsewhere of essential facilities for segregation, isolation for observation, and for prevention of cross infection. The following brief quotations from the Providence City Hospital Manual of Aseptic Technique illustrate the governing principles:

Anything which has come, directly or indirectly, in contact with a patient or an infected area is contaminated.

Infectious diseases are transmitted by actual contact, direct or indirect. Indirect contact takes place through a contaminated carrier. Air transmission is so rare that it need not be considered of practical importance, except that nurses must avoid patients coughing into their faces.

A unit is an area which represents a separate and distinct infection; such an area may comprise a single bed or an entire room.

Medical asepsis aims to confine each different infection to a physically separate unit. The chief object of the whole aseptic technique is to prevent the transmission of infection from one unit to another.

Gowns are worn by nurses for any work which involves intimate contact with the patient. The gown is taken from the hook and slipped over the arms in such a way that the nurse is not contaminated. After finishing her work the nurse scrubs her hands and folds the gown down the middle, clean surface inside, and hangs it on the hook in such a way that it can be slipped on again without contamination. Finally the nurse washes her hands again. If no gown is worn, the nurse is careful that none of her clothing shall touch the bed or anything in the patient's room, and only contaminates her hands or forearms, which can be scrubbed with soap and water. Gowns are changed at least twice a week and oftener if soiled with secretions.

SUMMARY OF RULES FOR NURSES.

1. Keep fingers, pencils, pins, labels, and everything of the sort out of your mouth.
2. Wash your hands frequently and always before leaving the ward and before eating.
3. After handling a patient don't touch your face.

4. Don't allow patients to cough or sneeze in your face.
5. Don't kiss a patient or allow him to touch your face.
6. Don't eat anything that a patient may wish to give you.
7. Keep and use your own drinking glass.
8. Change your uniform when entering or leaving the ward.
9. Stay out of doors as much as possible and sleep with your window open.
10. Remember that infectious diseases are taken and carried by *contact*, not by air transmission.

The essence of the technique of medical asepsis is: *Touch nothing pertaining to the patient except with your hands and then scrub your hands carefully.*

In logically carrying this out one finds that many things have problems of their own—the bed, the food tray, the water-closet, the door knob, and especially the washbasin and its fixtures.

There is reason to hope that in future contagious wards of naval hospitals—and what ward of a naval hospital may not at any time be a contagious ward—will be plentifully supplied with the necessary equipment, especially with foot-controlled washbasins, to permit of faultless medical aseptic technique in the care of contagious cases. This, with thorough indoctrination and conscientious execution, will save many lives.

	Remaining from 1916.	1917														
		January.		February.		March.		April.		May.		June.		July.		
		A. and RA.	DD.	A. and RA.	DD.	A. and RA.	DD.	A. and RA.	DD.	A. and RA.	DD.	A. and RA.	DD.	A. and RA.	DD.	
German measles		2	0	68	0	55	0	48	0	189	0	130	0	32	0	A. 524
Measles		0	0	3	0	1	0	5	0	24	0	21	0	8	0	A. 62
Mumps	1	0	0	1	0	1	0	3	0	14	0	24	0	24	0	A. 68
Chicken-pox		0	0	1	0	0	0	0	0	0	0	1	0	0	0	A. 2
Scarlet fever		0	0	0	0	0	0	0	0	1	0	1	0	1	0	A. 3
Diphtheria		0	0	0	0	0	0	0	0	5	0	1	0	0	0	A. 6
Meningitis, cerebro-spinal		0	0	0	0	0	0	1	0	5	[1] 2	1	0	0	0	A. 7 DD. 2
Pneumonia, lobar	5	6	4	6	2	7	1	10	0	20	6	15	[1] 5	6	0	A. 75 DD. 18
Pneumonia, broncho-		0	0	0	0	2	0	1	0	20	10	8	[1] 3	0	0	A. 31 DD. 13
Pleurisy, suppurative		0	0	1	1	2	0	4	2	5	0	18	6	0	1	A. 30 DD. 10
Total admissions result of infections		8	0	80	0	68	0	72	0	283	0	220	0	71	0	802
Total deaths from and following infections		0	4	0	3	0	1	0	2	0	18	0	14	0	1	43
Deaths from other causes			0		0		1		0		2		1		0	4
Causes:																
Tuberculosis, chronic, pulmonary			0		0		1		0		0		0		0	1
Wound, gunshot L chest			0		0		0		0		1		0		0	1
Appendicitis, acute			0		0		0		0		1		0		0	1
Dilatation, acute cardiac			0		0		0		0		0		1		0	1
Total admissions all causes	62	54		124		147		159		443		315		225		1,529
Total deaths, all causes			4		3		2		2		20		15		1	47
Total sick days		3,199		2,377		3,354		3,122		7,013		8,515		7,219		31,799
Reserve force (included above), admissions, readmissions, and deaths	0	0	0	0	0	0	0	27	0	88	[1] 1	69	[1] 2	36	0	A. 220 DD. 3

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[1] Deaths of Naval Reserves.

Following German measles:	
Pleurisy, suppurative	2
Pneumonia, broncho-	7
Pneumonia, lobar	4
Following measles:	
Pleurisy, suppurative	1
Pneumonia, broncho-	3
Pneumonia, lobar	1
	18

CONTAGIOUS HOSPITALS.

By R. K. Joslin, Assistant Surgeon, United States Naval Reserve Force.

The proper control, isolation, and nursing of patients having a communicable disease is of the greatest importance, especially at the present time, to the medical men of the Navy. With both barracks and camps filled with men from all parts of the United States, carriers, as well as mild and missed cases, are prone to be found among them. It is therefore desirable to have buildings in which these cases can be properly cared for, as well as isolation wards to control those cases having doubtful or undetermined diagnosis. In the past 25 years much has been learned to increase our knowledge of the mode of transmission in contagious diseases. To quote D. L. Richardson, M. D., superintendent of the Providence City Hospital:

> The problem of controlling infection resolves itself, then, into measures for preventing the transference of secretion or excretion from the sick to the well, either by direct or indirect contact. Lord Lister taught surgeons that clean operative wounds were possible by employing "antisepsis." The asepsis of to-day is Lister's "antisepsis," without the antiseptic spray to sterilize the air. Asepsis will do for the medical care of patients suffering from infectious disease what it has done for surgery.

To enable both the medical and nursing personnel to properly carry out the simple technique required in aseptic fever nursing, wards having special features and equipment are necessary, since the older type of contagious hospitals is inadequate and unfitted for its proper control.

In 1888, Grancher, of Paris, began the work which paved the way to the building of the Pasteur Hospital, holding 120 patients housed in two 2-story buildings, and completed in 1900. At a later date English physicians adopted aseptic technique, and similar hospitals were constructed for contagious diseases. Ten years later, Dr. Charles V. Chapin, Superintendent of Health, city of Providence, R. I., who had visited the hospitals of both France and England, was able to have the Providence Hospital constructed upon plans modified to provide for the most modern medical asepsis.

The Providence City Hospital consists of a group of buildin having a scarlet-fever ward, diphtheria ward, isolation ward, tuberculosis ward, administration building, service building, power hou and laundry, and an ambulance station, as shown in figure 1.

The diphtheria and scarlet-fever wards are similar, both buildings being two stories high, the first and second floors planned ali By adopting both the "barrier" and unit system, 100 patients ca be accommodated in these two buildings (fig. 2).

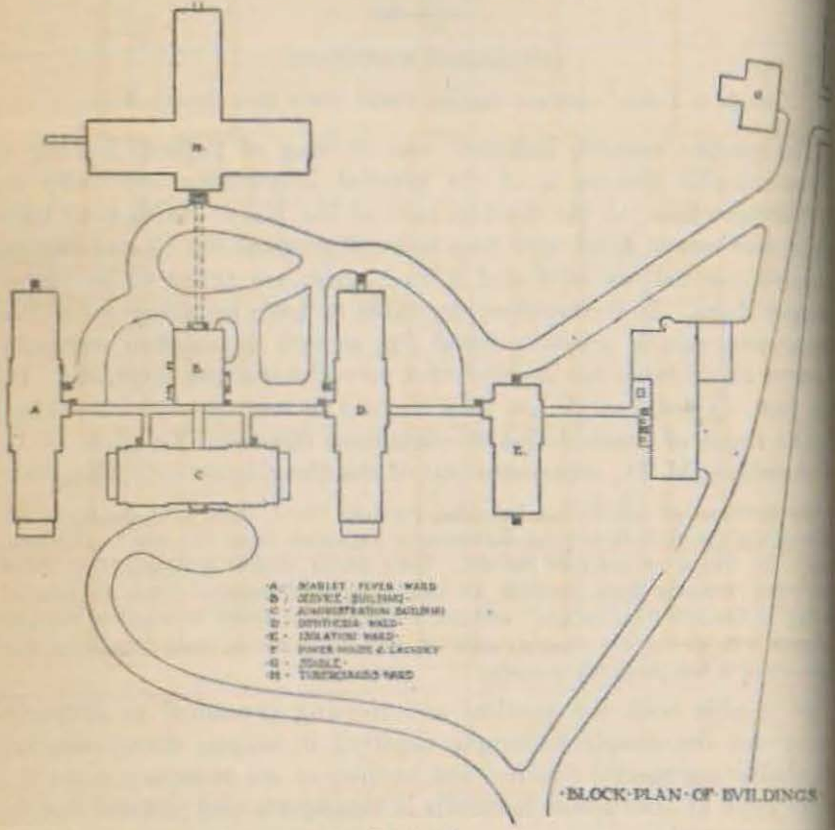
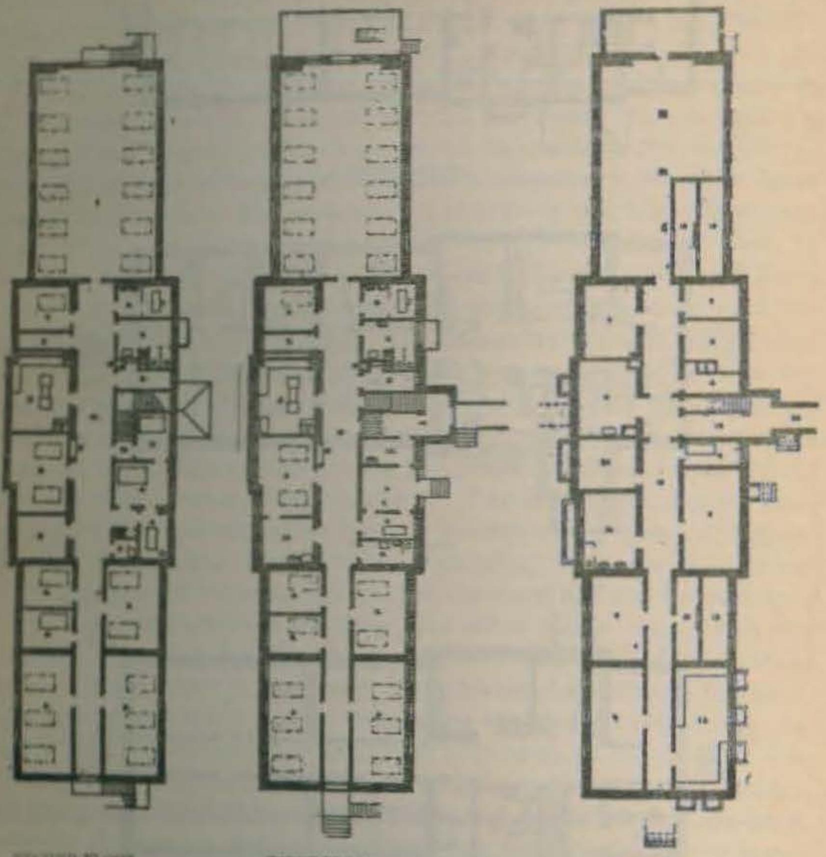


FIGURE 1.

The isolation ward, first floor, has 11 separate units. One to thre bed units are located on the second floor, making a total capacity of 24 beds in this building. This ward is of special interest to us, as i is constructed on a unit or cubical plan and can be used to house all contagious cases. Similar temporary wards can be easily erected along these lines as an addition to the regular naval hospitals (fig. 3).

A group of buildings has been planned, modified from the isolation ward of the Providence City Hospital, consisting of an administration building and two wards holding 76 beds, with room for three additional wards, which would extend the hospital capacity to 188 beds. The size of the buildings and number of wards was planned to



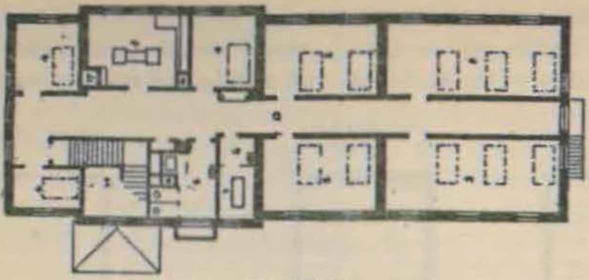
SECOND FLOOR. FIRST FLOOR. BASEMENT.

FIG. 2.—DIPHTHERIA WARD.

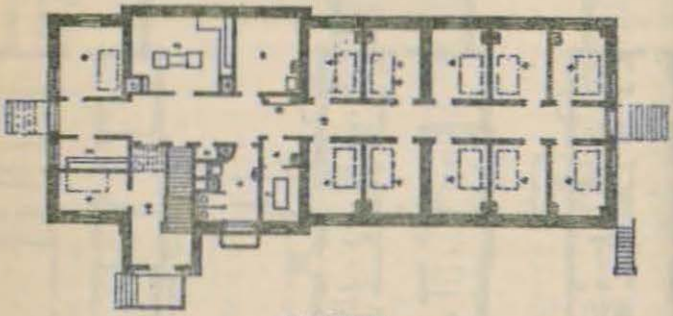
(Scarlet-fever ward similar.)

1. Twelve-bed ward.
2. Two-bed ward.
3. Three-bed ward.
4. Room.
5. Diet kitchen.
6. Lavatory.
7. Bath.
8. Linen closet.
9. Closet.
10. Operating room.
11. Examining room.
12. Robing room.
13. Corridor.
14. Stair hall.
15. Medicine closet.
16. Dryer.
17. Dumb waiter.
18. Chute.
19. Heating chamber.
20. Patients' clothes room.
21. Nurses' clothes room.
22. Laboratory.
23. Tunnel.

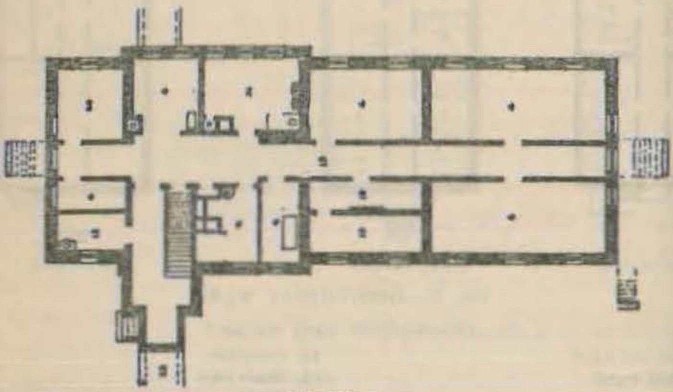
suit conditions at the Newport Naval Hospital. The situation, number, and size of buildings would in each case depend on the available land and the number of patients to be accommodated. Buildings are



SECOND FLOOR.



FIRST FLOOR.



BASEMENT.

FIG. 3.—ISOLATION WARD.

2. Two-bed ward.
3. Three-bed ward.
4. Room.
5. Diet kitchen.
6. Lavatory.
7. Bath.
8. Linen closet.
9. Closet.
10. Operating room.
11. Examining room.
12. Robing room.
13. Corridor.
14. Stair hall.
15. Medicine closet.
16. Dryer.
17. Dumb waiter.
18. Chute.
19. Heating chamber.
20. Patients' clothes room.
21. Nurses' clothes room.
22. Laboratory.
23. Tunnel

proposed, with space to add three more wards, if necessary, one administration building being sufficient for a group of five wards. All buildings one story high to be heated and lighted by a central power and heating plant from the main hospital. Food prepared in the main hospital kitchen is brought in food carts to the diet kitchen, from which it is served to each ward.

The administration building, 81 by 30 feet, has a central corridor, on one side of which is an office room for nurses with a separate lavatory and shower bath, which would be available for the female nurses in charge of the ward, and also a dispensary, which is large enough to serve both the purpose of a pharmacy and laboratory combined, where specimens could be examined without bringing them to the main hospital. The examining room and usual store and linen rooms are also located in this building, one storeroom being used for the storage of patients' clothing. The examining room, 12 feet 4 inches by 11 feet, is equipped with metal table, one small bedside table for stethoscope, head mirror, throat sticks, etc., several metal chairs, small metal wall cabinet, and a lavatory operated by foot-levers, with soap and nail-brush containers for the proper washing of the hands after the examination of each patient. Two large ground glass windows give the best available light, a matter of the greatest importance in this room. Next to the examining room are two locker rooms, equipped with metal lockers for the ward and service uniforms of the hospital corpsmen on duty; the other locker room, with the same equipment, is for the street and ward uniforms of the female nurses. Each room is equipped with the usual foot-lever lavatory. as in each of the ward units. Gowns for the medical officers may be kept in one of the locker rooms. The only areas of infection in this building are the examining room, where the patients are first taken, and the locker room, where the doctors' and nurses' clothes are kept. Patients' clothes are sterilized before being put into the bag or storeroom. A lavatory operated by foot-levers and toilets, available for the doctors, is located at the end of the hall near the doctor's locker room.

The administration building is connected to the first ward by corridors, glazed on either side. Opening into this corridor are both steps and an incline. Similar corridors connect each ward, making a continuous passage from the administration building to the last ward of the group of buildings.

The ward is divided by a central corridor, on either side of which are located 12 separate units, or isolation rooms, large enough for two beds each if necessary, a room for the hospital apprentice in charge, a diet kitchen, minor surgical operating room, and a toilet.

At each end of the corridor is a small ward or solarium, having a capacity of six beds each, for convalescent patients. The other buildings of the group are duplicates, except that the minor surgical room is a two-bed unit, only one surgical room being necessary for the ward group. The minor surgical room is available for all surgical treatment that may be indicated by complications in contagious diseases, and here also major operations may be performed This room, 11 feet 4 inches by 12 feet, is equipped with a lavatory operated by foot-levers, instrument case, operating table, small sterilizer for instruments and basins, and a small instrument table The windows, extending to the ceiling, are glazed with ground glass affording the best of light. There is also a window of ground glass on the corridor side. The diet kitchen, 11 feet 4 inches by 12 feet, is equipped with a small refrigerator, dresser, sink, and tray sterilizer. The Hospital Corps room, for the apprentice on duty, is equipped with a desk, chair, a rack for chart boards, and a lavatory operated by foot-levers. At one corner of this room is a window on the corridor side, outside of which a mirror is placed to enable the apprentice in charge to look up and down the corridor to prevent those patients convalescing in the separate units from visiting each other. The toilet room in each ward is equipped with a shower bath and drying floor, toilets, slop sink operated by foot-levers, sterilizer for utensils, bedpan racks, and a foot-lever lavatory. A door leads out of this room to a roofed-over iron platform, where mops and brooms are kept, rubber sheets may be dried, etc. Each ward unit 11 feet 4 inches by 12 feet, is equipped with two beds, two small metal bedside tables, lavatory with foot-lever control, soap and nail brush container, glass shelf, toilet-paper rack, two hooks for gowns towel rack, and metal basket for soiled towels. The beds have whee casters, so that they can be easily rolled out to the solarium at th end of the ward. A window is located in the corridor wall t enable the nurse to look into each separate unit without entering The lighting system for each unit is controlled from the corridor sid instead of within the room, a switch being placed outside of each door. The solariums at each end of the ward are equipped with si beds, bedside tables, shelves, hooks, and a lavatory as in each unit Convalescents here are controlled by the "barrier" system.

In the contagious hospital as planned above, modified from th isolation ward of the Providence City Hospital, patients with al forms of contagion can be properly isolated and the amount o mixed infection reduced to the minimum without having large separate wards for each separate type of case. This saves expense an reduces the size of personnel needed for the care of a large numbe of cases, and affords the best method for obtaining modern asepti technique.

THE HOSPITAL CARE OF CONTAGIOUS DISEASES.

By LUCILE A. BUTLER and VIRGINIA RAU, Nurse Corps, United States Navy.

The study of contagious technique as carried on by some of our leading hospitals of to-day is very interesting and profitable.

After spending some time in one of these hospitals one comes to the conclusion that there is a way to care for people afflicted with a contagious disease without danger to the community or to the nurse; also that it is unnecessary to isolate those in attendance upon them as has been done heretofore.

It has been proved without a doubt by those who have made a careful study of contagious diseases that they are transmitted by contact and are not air-borne, as was formerly supposed. The contact may be direct or indirect—direct when there is actual contact with the patient and indirect when there is contact with a contaminated carrier. Anything that comes in contact with a patient, directly or indirectly, is contaminated and should be considered dangerous.

In order that time and labor may be saved when caring for these patients, it is necessary to divide them into units. A unit is an area which represents a separate and distinct infection. It may comprise a single bed or an entire room.

In caring for these different units it is necessary to use aseptic technique, the object being to confine the infection to one unit. In carrying out the medical asepsis one must remember that he is protecting himself from the patient, whereas in surgical technique the object is directly the opposite. The carrying out of the technique, however, is practically the same.

Each new admission is usually under observation for one week and is placarded "Detention," either bed or door detention, depending upon how many other units occupy the same room. Another placard, "Barrier," denotes that there is a question of diagnosis, or that other patients suffering from a different disease are being treated in the same ward. If after the detention period there is no question about their diagnosis patients may be transferred to a large convalescent room.

Corridors, kitchen, operating room and, as a rule, one utility room are kept free from contamination.

The nurses wear short-sleeved uniforms with the skirts about 5 inches from the floor. The school cap is also worn. Large gowns are worn by the doctors and nurses only when they come in intimate contact with the patients. The sleeves of the gowns extend down to the wrists where they are confined by elastic bands.

Before the nurses enter the wards they proceed to a dressing room, where each nurse has two lockers, one is marked "House uniform" and the other is marked "Ward uniform." The ward uniform is put on and the nurse is ready to go to her ward. When going off duty the ward uniform is exchanged for the house uniform, first washing the hands before touching the house uniform.

The patients' rooms contain a bed, bedside table and chair, these constituting the actual areas infected. When the patient is discharged the bed, chair and table are washed with soap and water. The mattress is aired for 24 hours unless in case of death or a cross infection, when it is taken to the sterilizer. Soap and water, air and sunlight are the important germicidal agents in carrying out this theory. All rubber goods, toys, combs, shoes, slippers, etc., which would be destroyed by sterilization in an autoclave, are simply washed off with soap and water and aired for 24 hours. The patient's clothes worn on admission are sent to the laundry—that is, anything that is washable. Suits, furs, hats, and gloves are aired for 48 hours in the sunlight.

When ready to care for her patient the nurse puts on her gown, which hangs in the room, and proceeds to bathe the patient, make the bed, and take the temperature. When through with this she washes her hands and unties the strings on the neck of her gown, then those at the belt, bringing them forward and tying them so they will not drag on the floor. She then removes the gown and folding the inside in hangs it on the hook. Her hands having thus been contaminated again she gives them a thorough scrubbing. The scrubbing bowls are kept uninfected and are operated by the arm-lever or by the foot-pedals. The hands are held under running water and then soaped with a liquid from a container attached above the bowl, when they are scrubbed with a nailbrush. The palms are scrubbed, while the back of the hands and the arms are simply well washed, as the skin is too sensitive for the constant application of a brush. Individual towels about 15 inches square are used. In choosing the material for the towels it has been found that linen or huck which has been well laundered has been the least irritating to the skin and most satisfactory in regard to the wear of the laundry.

If the ward contains five or six patients of the same unit, i. e., all scarlet fever or diphtheria, it is not necessary to scrub between patients. Each room contains a small shelf large enough to hold a jar with 65 per cent alcohol for the thermometer and individual jars for cotton and ointment. In a ward with several units more shelves would be needed. Hooks for gowns are provided in the same manner. When planning the rooms it would be well to have the wash-bowl fixtures on the opposite side from the gown and shelf fixtures.

Soiled linen is thrown down a chute operated by a foot or arm control. This laundry is gathered up by a porter who wears a gown and washable gloves which are thrown in the laundry when he has finished.

The porter wears a gown and gloves when entering an infected building. The doors are usually opened and left open until he has completed whatever work he is about. If only one hand is used in carrying a pail or basket the glove on the noninfected hand could be slipped off and the door be opened with the clean hand. All door knobs on the outside of the doors are washed daily with soap and water. Any repairs made-by workmen are made without wearing gowns, as they never handle the patients and always wash their hands on leaving the ward. Maids for the wards always wear gowns, removing them before leaving the wards and scrubbing their hands.

The food served in these wards is sent to each floor from a food carrier in the basement, which has been wheeled from the main kitchen, and is placed on a dumb-waiter. It is then taken off at each serving kitchen and served on the trays. When collecting these trays they are placed in a large steam dish sterilizer, one at a time. The dishes with the waste food are then taken out without touching the outside of the sterilizer and the food emptied into the waste can, which is next to the sterilizer. The dishes are then replaced in the sterilizer. The maid then turns on the water until all the dishes are completely covered. She then turns the steam on. The dishes are kept in until 15 minutes after the boiling point has been reached, when they are taken out and given the ordinary dish washing.

Bedpans and urinals are emptied into a hopper and washed with running water, after which they are placed in a utensil sterilizer, and when a sufficient number have accumulated they are covered with water and boiled for the same length of time as the dishes. This same technique applies to other basins and other utensils used in an infected area.

Before sweeping floors they are sprinkled with oiled sawdust, and the brooms used are scalded between each room. After all the rooms are swept one attendant gathers up the sweepings with a pan and brush, which are afterwards scalded and aired.

In case of death the same technique is carried out, the bodies being considered infectious. The nurse wears her gown when bathing the body and all orifices are packed with carbolized cotton. She then summons the porter, who takes the body to the morgue wrapped in a clean sheet.

All patients must stay in their own rooms unless they are allowed out of doors or have lavatory privileges. If children come out of their rooms or throw toys out of their own area they are kept in bed, or if necessary the door is closed. The toys given to very small children are usually tied in some manner to the bed.

Patients are permitted to write letters and collections are made triweekly, when they are sent to the dry sterilizer. Legal documents may be signed without contamination if two clean towels are spread on the bedside table and the paper placed between them, leaving the space for signature uncovered. The nurse holds the towel and paper steady and the patient to whom an inked pen is given affixes his signature.

Special points to be remembered in the carrying out of this technique are: Never to touch the face while the hands are contaminated, not to lean against beds, chairs, or any furniture in the room unless a gown is worn. Remember to take into the room everything necessary to serve the patient before getting contaminated, to avoid either extra scrubbing of hands or the calling of a clean nurse away from her duties. Always scrub under running water.

This special technique would probably differ somewhat in different hospitals, but it should be remembered that the fundamental principle is the avoidance of contact, direct or indirect.

In summarizing this collected data it must be borne in mind that it is absolutely imperative to have the proper equipment at hand, i. e., plumbing, sterilizers, an abundance of linen, gowns and towels, particularly, before a practical demonstration can be carried out.

THE EXAMINATION OF AVIATORS.

By R. A. Bachman, Surgeon, United States Navy.

The examination of aviators presents many new points which differ from the usual physical examinations given to officers and enlisted men.

Flying is a new science and new faculties are brought into play, the soundness of which must be determined in the applicant. In addition to physical fitness, the emotional apparatus must be tested.

The Army Signal Corps has adopted a very complete procedure in examining its flyers and in this article liberal extracts will be made from the examination blank and its general form followed.

A new departure in physical examinations is the introduction of the Bárány tests for determining the condition of the vestibular function. Prof. Bárány originally devised these tests some years ago, but the modified technique employed at present and the application of the same to the examination of flyers is the work of Drs. Randall, Jones, Fisher, and Gile, of the University of Pennsylvania.

It will be noted, too, that the former physical examinations have been amplified and elaborated in many other respects.

In flying, the human body is pursuing such an unusual occupation in such an unusual environment that ordinary methods of examination must necessarily prove inadequate. It must be borne in mind, also, that flying being a new science, new experiences are bound to accumulate, which will in all probability produce many future changes in the present proposed method of physical examination.

That the examination ought to be thorough and searching seems to be self-evident. It will be observed that a good many of the eye and ear tests are of German and Austrian origin. What these countries have done along this line since the war no one knows but it is sound military judgment to assume that their flying corps has been very carefully selected. We must meet this condition by an equal care in the selection of our men.

A tentative routine would be somewhat as follows:

GENERAL EXAMINATION.

1. Height, ------ inches. Weight, ------ pounds.
2. Chest, ------ expansion. -------- inspiration.

Follow Bureau of Navigation M. and S. Circular 125221, March, 1917: Instructions for Physical Qualifications Required for Appointment for Aeronautic Duty in the Navy or Marine Corps.

3. Lungs.
4. Bones and Joints.
5. Skin.
6. Nervous System:
    Reflexes of knee ------ elbow ------ ankle ------
    Vertigo.
7. Vascular System.
    (*a*) Pulse.
    (*b*) Arteries.
    (*c*) Blood pressure—systolic—diastolic.
    (*d*) Heart.
8. Digestive system:
    Vomiting.
9. Urinalysis:
    Shreds.
    Specific gravity.
    Reaction.
    Casts.
    Sugar.
    Albumen.
10. Wassermanns.

11. *Dynamic tests.*—(*a*) Walking: This test should be done by having applicant, with closed eyes, walk forward, barefooted, 20 feet and backward to point of starting. A straight line should be followed.

(*b*) Romberg: Maintain position for one minute without swaying.

12. *Eyes—History of eye trouble—Visible lesions.*—Question the candidate carefully regarding previous or present eye trouble, use

of glasses, headaches, lacrymation, scotoma, and photophobia; also diplopia (muscae volitantes, panorama symptoms), glaucomatous symptoms, night blindness or asthenopia when not wearing correcting lenses. Any one of the latter group disqualifies and also of the former group, if marked. Note findings.

13. *Stereoscopic vision.*—Stereoscopic vision is the ability to appreciate depth and distances by means of binocular single vision. Objects printed on the test cards furnished for use with the stereoscope are drawn to scale, the distance between corresponding points of similar objects are equal; between dissimilar objects, unequal. They are seen at different apparent depths, the result of superposition of each two similar images in space; the less the distance between the objects, the nearer they appear to the observer's eyes; the greater the distance between, the farther away they appear. A normal eye can appreciate an apparent difference in distance between stereoscoped objects of 0.01 millimeter. Adjust the oculars of the stereoscope at their focal distance (15 centimeters) from the glass stage and rotate by means of the milled edge on either ocular cup so that the interpupillary distance will be as great or greater than the distance between any two similar points of objects to be stereoscoped. With good illumination, have the candidate name the sequence of objects from front to rear as he sees them through the stereoscope. This should be done readily and without error, otherwise it is a cause for rejection.

This test is best made by test card devised by Zeiss, of Jena. Bausch and Lomb probably have similar cards.

14. *Ocular movements.*—Ocular movements are tested roughly by requiring both eyes of the candidate to be fixed on the examiner's finger, which is carried from directly in front to the right, to the left, up and down. The movements of each eye must be regular and identical.

15. *Pupillary reactions.*—R______ L______

Pupillary reactions should be regular and equal in each eye when responding to (1) direct and (2) indirect light stimulation and (3) to accommodation. Face the candidate and place a card as a screen before both eyes. Uncover one eye after a short interval and allow light to shine in this eye. The resulting contraction of the iris of this eye is called direct. Repeat, but now observe the shaded eye. This reacton is indirect or consensual of the shaded eye. Repeat for the other eye.

With both the candidate's eyes open and uncovered, have him fix on a pencil held a few inches directly in front of him: bring the pencil toward him until it nearly touches his nose. Both irises will contract, which is called the reaction to accommodation.

16. *Intraocular tension.*—R______ L______

Intraocular tension is tested roughly by palpation. With the candidate looking down, palpate the eye through the upper lid with the index finger of each hand, and compare the tension with the other eye and with an eye believed to be normal. If not normal it is a cause for rejection.

17. *Nystagmus.*—Ocular nystagmus is determined, and if it is rythmical and occurs ------ (*a*) and (*b*) ------ on looking straight ahead or laterally, 40° or less, it is a cause for rejection.

Spontaneous ocular nystagmus produced by extreme lateral sight. 50° or more, is not a cause for rejection, as it is found in the normal individual. It is usually manifested by a few oscillating lateral movements, never rotary, which appear when the eyes are first fixed in extreme lateral positions. Select a scleral vessel near the corneal margin as a point for observation.

18. *Field of vision.*—R------ L------

Field of vision is tested separately for each eye. Place the candidate with his back to the source of light and have him fix the eye under examination (the other being covered) upon the examiner's, which is directly oposite at a distance of 2 feet. The examiner then moves his fingers in various directions in a plane midway between himself and the candidate, until the limits of indirect vision are reached. The examiner thus compares the candidate's field of vision with his own and can thus roughly estimate whether normal or not. A restricted field of vision should be confirmed by the use of a perimeter, as it would then be a cause for rejection.

19. *Color perception.*—This should be made with the Jennings test cards. In this test the yarns are fastened to a card—each shade beside a perforation. The candidate punches through the perforation and makes a record card. There is no guesswork, a permanent record is made and the scientific arrangement of the confusion colors insures proper application of the test.

20. *Muscle balance, at 20 feet.*

Hyperphoria.
Exophoria.
Esophoria.

If available, a phorometer should be used to determine the absence or presence of a muscular imbalance. Adjust the phorometer close to and in front of the candidate's eyes, 20 feet distant from a lighted candle or other small point of light on the same level. Darken the room and arrange the prisms so that their bases are situated inward; two images of the light will then be seen displaced laterally. If on a level, there is a normal balance of the vertically acting extrinsic eye muscles or orthophoria; if not on the same level, there is vertical imbalance or hyperphoria; left if the left image is below, right hyperphoria if the right image is below. Read off on the scale the amount necessary to bring the images on the same level.

Repeat the test with the prisms, one up and one down. If the images are now directly above each other there is no lateral imbalance, but if laterally displaced and on the same side with the eye seeing each image, there is homonomous diplopia due to a lateral imbalance called esophoria. If the images are crossed there is exophoria. Read off on the scale the amount necessary (prism diopters) to bring them in the same vertical meridian. If not more than 1° of hyperphoria and more than 2° of esophoria or exophoria, the test is satisfactory.

21. *Visual acuity.*—(*a*) Snellen's type (20 feet).

Require 25/20 for each eye. There is no reason why the requirements for gun pointers should not be applied to aviators.

(*b*) Near point.—Right------. Left------.

Acuity for distance tested at 20 feet from a well-illuminated Snellen test card. Less than 25/20 in either eye, tested separately, disqualifies.

Near point, of acuity of vision, is determined separately for each eye by requiring the candidate to read in a good light the Jaeger No. 1 test type, first gradually bringing the card toward the uncovered eye until the nearest point to the eye, at which the test type still remains distinct, is reached. The distance of this point from the anterior surface of the cornea, measured in centimeters, is the near point. Greater than 11 centimeters at 20 years of age, greater than 13 centimeters at 25 years of age, or greater than 15 centimeters at 30 years of age, disqualifies.

22. *Ophthalmoscopic findings.*—Drop one drop of a 5 per cent solution of euphthalmine in each eye. Have the candidate keep his eyes closed. After 15 minutes repeat the drops; examine 15 minutes later. A pathological condition of the fundus, active or quiescent, is cause for rejection.

23. *Ears—History of ear trouble.*—(*a*) Discharge, ------. Buzzing, ringing, or noise, ------. Vertigo, ------. Seasickness, ------. Cranial injury, ------.

24. *Appearance of ex-auditory canal.*

25. *Appearance of membrani tympani.*

EAR DETERMINATION.

Hearing should be normal for each ear. To determine this both the whisper and watch tests are used. After examining both external auditory canals and membranæ tympani by means of a speculum and a good light (first removing wax if present) for abnormalities, such as small and tortuous opening, presence of pus, perforation, scars, retraction, or other evidence of past or present inflammation, which are causes for rejection, the candidate is required to stand at 20 feet from the examiner, facing away from him. An assistant closes the ear not under examination with his moistened index finger pressed firmly into the external auditory meatus. The examiner facing the back of the candidate exhales, and then, with his residual air, whispers numbers, words, or sentences which the candidate should repeat. The other ear will then be tested in a similar manner. If unable to hear, the examiner will approach until the candidate does hear, the distance being recorded in feet. If less than 20 feet, it is a cause for rejection. A quiet room is essential.

The watch test is preferably made with a loud-ticking watch such as the ordinary Ingersoll, which, while variable, should be heard at about 40 inches. Any watch used should have been previously tried out on at least five normal persons and the distance heard made a matter of record. The number of inches in distance heard by the candidate, eyes closed and opposite ear occluded, is taken as the numerator and the distance the watch should be heard as the denominator. This should be the equivalent of 40/40; less hearing than this disqualifies.

26. *Examination of Eustachian tubes—per catheter.*

27. *Examination for diseased tonsils, adenoids, etc.*

EQUILIBRIUM (VESTIBULAR).

28. *Equilibrium* (vestibular). Head tilted forward 30° to level horizontal canal, using *Bárány* chair. Eyes closed. Rotation nystagmus normal, 26 seconds; a variation of 10 seconds under and 6 over is allowable.

(*a*) Right: Applicant to be turned toward his right, 10 turns in exactly 20 seconds; horizontal nystagmus to left for ——— seconds, amplitude.

Left: Applicant to be turned toward his left, 10 times in exactly 20 seconds; horizontal nystagmus to right for ——— seconds, amplitude.

Always test for spontaneous nystagmus before rotating.

(*b*) Pointing tests:

(1) Before turning.
  Right arm, ———.
  Left arm, ———.

(2) After turning 10 times in 10 seconds to right.
  Right arm, ———.
  Left arm, ———.

(3) After turning 10 times in 10 seconds to left.
  Right arm, ———.
  Left arm, ———.

(*c*) Falling tests:
(1) Turn to right, 5 turns in 10 seconds.
Falls to, ——.
(2) Turn to left, 5 turns in 10 seconds.
Falls to, ——.

If applicant is disqualified, use douche tests in every case.

The nystagmus, past-pointing and falling, are tested after turning. The turning-chair must have a headrest which will hold the head 30° forward, a foot rest and a stop-pedal. Use a stop watch.

(*a*) Nystagmus. Head 30° forward; turn candidate to the right, eyes closed, 10 times in exactly 20 seconds. The instant the chair is stopped, click the stop watch; candidate opens his eyes and looks straight ahead at some fixed distant point. There should occur a horizontal nystagmus to the left of 26 seconds' duration. Candidate then closes his eyes and is turned to the left; there should occur a horizontal nystagmus to the right of 26 seconds' duration.

(*b*) Pointing. (1) Candidate closes eyes, sitting in chair facing examiner, touches the examiner's finger held in front of him, raises his arm to perpendicular position, lowers the arm, and attempts to find the examiner's finger. First the right arm; then the left arm. The normal candidate is always able to find the finger. (2) The pointing test is again repeated after turning to the right, 10 turns in 10 seconds. During the last turn the stop pedal is released and as the chair comes into position it becomes locked. The right arm is tested, then the left, then the right, then to the left until he ceases to past-point. The normal will past-point to the right 3 times with each arm. (3) Repeat pointing test, after turning to the left.

(*c*) Falling. Candidate's head is inclined 90° forward, forehead to knees. Turn to the right, 5 turns in 10 seconds. On stopping, candidate raises his head and should fall to the right. This tests the vertical semicircular canals. Turn to the left, head forward 90°; on stopping, the candidate raises his head and should fall to the left. Unless each test is normal, it is a cause for rejection. Examination room should have apparatus for hot and cold douching of ear and for examination of drums.

In addition to the five senses ordinarily classified as special senses, the flyer uses his "muscle-joint-and-splanchnic" sense, and a seventh—the so-called "static sense."

Equilibrium is the result of a combination of the sight muscle and static senses. Of the three, the most directly concerned in balance is the latter, while the sight and muscle senses are only indirectly concerned.

This static sense has for its special organ the vestibular apparatus and the Bárány test as modified by the University of Pennsylvani workers gives a clear-cut picture of the condition of this organ so important to the aviator.

For instance, in the matter of high flying or flying in the dark the static sense becomes at once practically the only means of maintaining the correct relation of his machine and of himself, to the earth.

Again in performing some difficult evolution or a series of hazardous turns, such as must surely fall within the experience of any flyer engaged in active duty, a perfect equilibration sense is necessary to gauge correctly the speed, direction and length of motion followed in performing the loop or turn.

It will be noted that the normal nystagmus is 26 seconds. A variation from this of 10 seconds down and 6 seconds up is permitted.

A particularly sensitive ear registering, for example, 34 seconds, might be too easily afflicted with vertigo and thus prove undesirable. Thirty-two seconds would at present appear to be a safe high limit. The effect, of course, of repeated flights is, that tendency to vertigo is reduced as the brain becomes accustomed to registering certain normal (to flying) disturbances or impressions in the canals.

The chairs used in the nystagmus and past-pointing tests are of a special design, so that they can be turned easily by means of a turning rod, fitted with a handle, projecting from the back. A pedal mechanism releases the chair for revolving and brings it to a sudden stop after the required number of revolutions. The chair must be stopped suddenly or the experiments will fail. The turns must be counted and timed accurately.

The eye and ear tests should be made only by a specialist in those branches. If the Bárány tests fail the candidate is always put through the ear douching test before final rejection. In this test the eardrum is first inspected for perforations or other pathological conditions, and when found intact, a nozzle is inserted into the canal and water at a temperature of 68° F. is permitted to flow against the drum. With the head bent at an angle of 30° forward, the endolymph of the vertical canal is put in motion through cooling of the lower parts, on the thermosyphon principle, and causing a vertical nystagmus, a flow is produced. By turning the head backward or letting it fall forward, the horizontal canals are similarly affected. Nystagmus begins in about 20 seconds. If after four minutes of douching no results are produced the flow of water is stopped.

PSYCHOLOGICAL TESTS.

The psychological tests are made either by a Hipp chronoscope or a d'Arsonval chronometer.

The Hipp chronoscope is practically the same as the d'Arsonval chronometer and can be used for exactly the same purpose. The chief difference is that the clockwork of the Hipp instrument is actuated by a weight and that of the d'Arsonval by a spring mechanism. The Hipp is more accurate, giving its readings in the 1/100 of a second, the d'Arsonval in the 1/200.

The manner of taking the reaction is the same in both—a visual, auditory, or tactile signal is given depending upon the psychological reaction desired, which automatically breaks the current; the needle revolves, the subject presses a key, the current is connected again, and the needle stops. The reading is taken from a dial. The dial of each is scaled in 100 divisions, but in the Hipp the needle revolves around the full dial in 1/10 second, while in the d'Arsonval it makes the circuit in 1 second. In the Hipp the nature of the signal is left to the choice and requirements of the operator.

There is a Hipp chronoscope in use at the psychological laboratory of the University of Pennsylvania.

The value of these psychological reactions is still debatable.

It seems to be desirable that some form of tests be made to determine judgment and emotional control in the applicant. As for the latter, it would appear to be reasonable that this testing could best be made during the stage of apprenticeship which the flyer undergoes. The various emotional disturbances which the beginner experiences react on him considerably and the teacher usually becomes quickly cognizant of them. Those who show inaptitude in this respect could be weeded out at the aviation camps. A medical officer's supervision is always at hand at every flying camp, and he could be utilized to assist the instructor in making observations. At present the method employed of producing a sudden shock, such as shooting a pistol or creating some other loud noise suddenly behind the unexpecting candidate does not meet the requirements.

To establish the presence of normal judgment in a candidate is not easy, yet very necessary. Judgment of distance, time and speed enter considerably into flying in all its phases. A crude attempt to obtain some means of measuring this mental attribute was made recently at the Naval Hospital, Philadelphia, Pa.

Two sticks, twenty-seven inches and twenty inches long, respectively, were hung on a wall; a board with three revolving 9-inch disks, each disk revolving at a slightly different rate of speed, was made; and an 8-inch wooden square was sawed in seven pieces. A sand watch was also used.

To determine distance judgment, the candidate was required to estimate the length of the two sticks, after having been shown a yardstick. To determine time judgment, he was required to estimate the length of time it took for a certain amount of sand to run back after he had been permitted to see it flow into the empty compartment. The operator tried to approximate a half minute in the filling.

"Arrangement judgment" was gauged by the length of time required to arrange the sawed pieces of wood into a perfect square. Speed judgment was measured by the candidate's ability to range the disks in the order of their speed. The diameter of the blocks, attached to the disks, which carried a string belt imparting motion to them, was 5½, 6, and 6½ inches. Thus they moved almost at the same rate of speed.

A hundred men were examined and the results tabulated. The 30 best results and the 30 poorest are appended. All of the latter missed at least two tests by a big margin. Of the 30 best ones, none took more than 30 seconds on the blocks, excepting No. 11, a man 47 years of age. All of them ranged the disks correctly. The watch test exceeded 10 seconds in only five instances. The average error in guessing the length of the two sticks exceeded 10 inches only once. In the 30 poorest it was exceeded nine times. These figures warrant, I think, the conclusion that tests of judgment are possible, especially if better mechanical appliances are used instead of the crude, makeshift objects hurriedly devised for making the above tests.

The points I wish to emphasize in conclusion are that an eye and ear specialist should conduct the examinations of these organs, that the Bárány test should be accurately made with a well-constructed chair by an ear specialist, that abnormal emotional disturbances should be noted by observation during the apprentice period, that judgment tests can be applied but are difficult of standardization, and finally that a standard examination chart should be furnished to make the examination of aviators complete, thorough, and uniform.

THE THIRTY POOREST.

Name.	Rate.	Occupation.	Age.	Blocks (minutes).	Sticks (inches).	Disks.	Watch (minutes).	Remarks.
1 H., E. J	HA	Conductor, high school.	19	7	34 24	1/3	3	
2. O., J. S	HA-1	3 years drug clerk, ninth grade P.	23	35	24 18	1/3	2½	Dull; slow of comprehension.
3. S., W. D	Ch. Y	Stenographer B. C., grammar school.	20	112	40 30	1/3	5	
4. F., E. H	Ch. Y	Stenographer, high school.	20	185	25 18	3/3	15	
5. N., J. F	Sea	Iron worker	24	21	30 22	1/3	32	Very poor idea of time space.
6. W., S	HA	1 year college, assayer.	24	34	24 16	0/3	0	
7. R., E	Pvt. M. C.	Laborer	22	487	25 21	0/3	13	Very sluggish mentally; seems to comprehend, but to be unable to carry out his thought.
8. E., R	HA	Printer	20	23	36 24	0/3	6	

Name.	Rate.	Occupation.	Age.	Blocks (minutes).	Sticks (inches).	Disks.	Watch (minutes).	Remarks.
9. N., J. N	F-2	Laborer	23	425	15 13	0/3	58	Patient seems to be a hi grade imbecile; very inatte tive.
10. P., W. W	HA	High school	19	23	24 18	0/3	10	
11. R., W	MsA-2	Packer (negro)	18	195	25 16	1/3	14	Nervous and inattentive.
12. G., T. E	HA	Molder	19	82	30 24	0/3	4	Nervous and a little dull comprehension.
13. J., A. W	Ph.M-2	Druggist	26	82	27 19	0/3	15	
14. B., J. D	HA-1	Clerk	19	29	24 12	1/3	36	
15. G., H	HA-1	1 year college	24	83	28 16	1/3	12	
16. R., E	Sea	Mechanic	21	19	28 19	1/3	5	
17. N., K	HA-1	Lineman	23	19	30 20	1/3	2	
18. W., H. E	HA-1	Clerk	18	38	24 18	0/3	7	
19. C., D. H	Ph. M-2	4 years high school.	22	82	26 19	1/3	10	
20. K., J. J	Ch. Y	Real estate, high school.	25	60	36 24	0/3	5	
21. H., F. C	Asst. surg.	M. D., assistant surgeon.	22	29	36 22	1/3	3	Slow.
22. H., J. J	do	Student, M. D	24	46	24 18	0/3	5	Slow; slow to comprehend.
23. C., C	do	do	30	88	30 18	3/3	0	Failed to comprehend bloc test.
24. M., W. T	Sea.-2	Clerk	25	62	24 15	3/3	6	
25. M., W. B	W. T	Locomotive engineer.	32	122	24 18	1/3	15	Lost position because of acc dent.
26. A., H. A	M-1	Clerk	24	242	18 12	3/3	20	Very dull of comprehensio mentally slow; apparentl nervous.
27. T., J. C	HA-1	Salesman, 4 years high school.	20	152	24 18	3/3	8	
28. H., B. F	El-2	Moving-picture operator, 1 year high school.	25	370	30 24	0/3	5	
29. U., L	Ph. M-2	Clerk	23	186	36 24	1/3	3	Filipino.
30. T., T. V	HA-1	do	21	30	26 18	0/3	3	Not athletic.

THE THIRTY BEST.

Name.	Rate.	Occupation.	Age.	Blocks (minutes).	Sticks (inches).	Disks.	Watch (minutes).	Remarks.
1. T., M. H	HA-1	Student, 2 years college.	23	10	30 18	3/3	15	Quick of comprehensio speedy in replies; footbal runner.
2. S., C. L	HA-1	Student, 3 years college.	22	10	28 14	3/3	2	Fairly quick at comprehensi football; runner.
3. H., A. W	HA-2	Student, 1 year college.	20	11	20 14	3/3	1	Fairly quick at comprehensi some athletics.
4. P., W. D	HA-1	Printer	20	14	32 20	3/3	2	Mentally alert; basket ball.
5. O., W	HA-1	Salesman, 1 year high school.	22	9	27 18	3/3	6	Track athlete; football; swimmer.
6. L., W. F	HA-2	Printer, 1 year high school.	18	10	24 18	3/3	3	Quick at comprehension; basket ball; swimmer.
7. K., W. D	Pvt., 1st Pa.	Machinist	28	11	27 20	3/3	7	
8. W., S. W	Lieut	Engineer	33	28	26 16	3/3	6	
9. S., R. S	Bugler	Vocalist	29	21	32 21	3/3	4	
10. E., G. D	Sea-2	Machinist, student.	19	11	27 18	3/3	3	
11. A., A. M	1st serg	Clerk	47	11	30 24	3/3	5	
12. R., F. H	CMM	Machinist	31	15	31 25	3/3	4	

Name.	Rate.	Occupation.	Age.	Blocks (minutes).	Sticks (inches).	Disks.	Watch (minutes).	Remarks.
13. W., G	Sea-1	Machine helper	19	25	27 16	3/3	3	
14. L., W	Sea-2	Plasterer	19	15	27 17	3/3	4	
15. S., A. A	Asst. surg.	Clerk, student	26	22	26 18	3/3	1	
16. L., E. F	...do	Teacher, student	30	14	24 18	3/3	13	Good judgment and poise.
17. E., C. J	...do	Student	28	11	26 18	3/3	4	
18. N., C. S	...do	...do	27	12	28 22	3/3	8	Baseball.
19. R., H	...do	...do	25	8	26 18	3/3	6	
20. G., E	HA-1	2 years college, pharmacy.	22	10	30 24	3/3	12	Track; alert.
21. B., F. F	HA-1	Clerk	22	23	29 17	3/3	8	
22. T., B	HA-1	4 years high school	18	12	28 18	3/3	4	Alert; some athletic work.
23. D., J. M	HA	Clerk, 2 years high school.	24	6	28 20	3 3	20	
24. T., O. G	HA-1	4 years high school.	18	16	28 18	3/3	10	Basket ball.
25. W., E. W	HA-1	4 years high school, clerk.	19	9	22 18	3/3	3	
26. V., M. L	Pvt. M. C.	Collector	20	13	24 16	3/3	2	Athlete; high jumper.
27. V., N	HA-1	2 years high school.	18	9	28 18	3/3	1	Y. M. C. A. track team; basket ball.
28. H., J. O	Y-3	4 years high school, clerk.	21	8	28 18	3/3	15	All around athlete.
29. L., R. H	Asst. surg.	Hard work, student.	25	14	24 15	3/3	5	Not athletic.
30. K., P	...do	Student	25	8	28 18	3/3	3	Athlete.

PREPARATION OF DAKIN SOLUTION.

By E. R. NOYES, Assistant Surgeon, United States Navy.

If we are to judge by the discussions heard in connection with the preparation of this solution, considerable difficulty is experienced in obtaining a satisfactory product. As the object sought is the preparation of a solution containing between 0.45 and 0.5 per cent of sodium hypochlorite and one that will not be alkaline to phenolphthalein, this should not be and most certainly is not difficult of attainment. Many schemes and methods have been advanced for its preparation. From some personal experience and from testimony of others there seems to be no doubt that that method in which is used the chlorinated lime, dry sodium carbonate, and sodium bicarbonate, as purchased in the open market, is the easiest and only safe method for the preparation of the desired solution. This method is nothing more than a slight modification of the Pharmacopœial method for the preparation of "liquor sodae chlorinatae," which is sufficient assurance for its efficiency. It is felt that if the following directions, even though *apparently* involved and awkward, be closely followed success is assured, such assurance being based upon actual trial by those but little accustomed to laboratory methods and procedures.

As a sample of chlorinated lime containing not less than 25 per cent of available chlorine is the prime requisite and as samples of this substance are so variable in the available chlorine content, an assay is the first step in the process. This is carried out as follows: Obtain a representative sample by taking a portion from different parts of the container, mix thoroughly in a mortar, quickly weigh out 10 grams, place in a bottle and pour upon it 500 c. c. of water, stopper the bottle and allow to stand, with occasional shaking, for one hour. Filter a portion of this solution through a dry filter and into a dry flask until from 75 to 100 c. c. of filtrate are obtained. Call this filtrate A. Stopper the flask and keep it so. Now into a 100 c. c. volumetric flask measure exactly 10 c. c. of the filtrate, add 20 c. c. of a 10 per cent solution of potassium iodide, then 2 c. c. of glacial acetic acid, mix, and allow to stand for a few minutes, then add water to make 100 c. c. of solution and then thoroughly mix. Call this solution B. Fill a burette with this solution. In a beaker of about 75 c. c. capacity place exactly 5 c. c. of N/10 sodium thiosulphate, add about 2 c. c. of starch paste, and from the burette add solution B until a faint blue color is produced. Each c. c. of N/10 thiosulphate equal 0.003723 gram sodium hypochlorite and 5 c. c. will equal 0.018615 gram. Let it be supposed that it was necessary to add 28 c. c. of solution B from the burette to bring about the end reaction. Then the 28 c. c. contained the equivalent of 0.018615 gram of sodium hypochlorite. The 100 c. c. of B will contain X grams. Stated in the form of a proportion this becomes:

$$0.018615 : 28 :: X : 100$$

$$28X = 1.8615$$

$$X = \frac{1.8615}{28} = 0.0665$$

The 100 c. c. of solution B contain the equivalent of 0.0665 gram sodium hypochlorite. But this solution was made from 10 c. c. of solution A, so 10 c. c. of solution A contain that same amount. Ten c. c. of solution A contain 0.2 gram of the sample. Then, if 0.2 gram of the sample contains the equivalent of 0.0665 gram of sodium hypochlorite 100 grams of the sample will contain X grams, or—

$$0.2 : 0.0665 :: 100 : X$$

$$0.2X = 6.65$$

$$X = \frac{6.65}{0.2} = 33.25$$

The sample of chlorinated lime contains the equivalent of 33.25 per cent of sodium hypochlorite.

Having obtained a sample that assays above 25 per cent, the solution proper is prepared as follows: In a jar, bottle, or other vessel of 12 to 15 liters capacity place 200 grams of the chlorinated lime and pour on it 5 liters of water. Allow to stand in a cool place for two or three hours with occasional stirring. In another 5 liters of water dissolve 80 grams of dry sodium carbonate and 100 grams of sodium bicarbonate. Add this solution to that of the chlorinated lime. A gelatinous precipitate which does not readily settle will form. This must be converted into a granular condition by vigorous stirring or shaking. The container holding it must be closed in some manner, placed in a cool place, and allowed to settle. The clear supernatant fluid is then syphoned off into a large bottle. It is well to measure the solution as it is drawn off, for its volume must be known. Call this solution C.

The strength of the solution must now be determined. To do this proceed as follows: Place exactly 10 c. c. of this solution in a 100 c. c. volumetric flask, add 20 c. c. of a 10 per cent solution of potassium iodide, then 2 c. c. glacial acetic acid and allow to stand for a few minutes. Now add water enough to make 100 c. c. and mix. Call this solution D. Place in burette and titrate against 5 c. c. of sodium thiosulphate, just as was done with solution B in the assay of the sample. Let us suppose that it required 29 c. c. to bring about the end reaction. Five c. c. of the thiosulphate=0.018615 sodium hypochlorite. Then 29 c. c. of D contain this quantity of the hypochlorite. If 29 c. c. contain 0.018615 gram the 100 c. c. will contain X grams, or—

$$29:0.018615::100:X$$
$$29X=1.8615$$
$$X=\frac{1.8615}{29}=0.0642$$

One hundred c. c. of D contain 0.0642 gram of sodium hypochlorite. But this 100 c. c. of solution was made from 10 c. c. of solution C. Ten c. c. of solution C then contain 0.0642 gram of the hypochlorite. One hundred c. c. of C contain 0.0642×10=0.642 gram. This is too strong, hence dilution is necessary. As only 0.5 gram per 100 c. c. is desired we find by the proportion—

$$100:0.642::X:0.5$$
$$0.642X=50$$
$$X=\frac{50}{0.642}=77.88$$

that is, each 77.88 c. c. should be diluted to 100 c. c. with water, or to 7.788 liters 2.212 liters of water. Having made the necessary dilution it must again be standardized in order to avoid mistakes. If found to be of correct strength it is placed in well-stoppered bottles and stored in a cool, dark place.

It must be borne in mind that in this work solutions with which we deal are readily decomposed and should be kept in stoppered containers at all times.

The starch paste used as indicator is made by mixing one gram of starch with about 10 c. c. of water and pouring it into 200 c. c. of boiling water.

The N/10 sodium thiosulphate is made by dissolving 24.8 grams of the substance in sufficient water to make 1,000 c. c. of solution. This substance is also called sodium hyposulphite and has the formula $Na_2S_2O_3.5H_2O$. The reason for using 24.8 grams per liter for an N/10 solution is indicated in the following reaction:

$$2Na_2S_2O_3.5H_2O+2I=Na_2S_4O_6+2NaI+10H_2O.$$

It is observed that two atoms of iodine react with two molecules of the thiosulphate. If that be the case then one atom of iodine will react with one molecule of the thiosulphate. As one gram atom of iodine is used to make a liter of N/1 solution, then the gram molecule of the thiosulphate must be used to make a liter of N/1 solution. For an N/10 solution we would, of course, use 1/10 gram molecular weight.

In the assay use is made of the following reactions. Acetic acid liberates hypochlorous acid (HClO) from the chlorinated lime as:

$$2CaCl(ClO)-2HC_2H_3O_2=CaCl_2-Ca(C_2H_3O_2)_2-2HClO.$$

The acetic acid also liberates hydriodic acid from potassium iodide as:

$$KI-HC_2H_3O_2=HI-K(C_2H_3O_2).$$

The hypochlorous acid reacts with the hydriodic to liberate iodine from the latter:

$$2HI-HClO=I_2-HCl-H_2O.$$

The liberated iodine is then titrated against the thiosulphate, the reaction taking place being:

$$2Na_2S_2O_3.5H_2O+I_2=2NaI+Na_2S_4O_6+10H_2O.$$

In the preparation of the solution the sodium carbonate converts the chorinated line into calcium corbonate and sodium hypochlorite and sodium chloride as:

$$CaCl(ClO)+Na_2CO_3=NaClO+NaCl+CaCO_3.$$

In the assay of this solution the acetic acid liberates hypochlorous acid from the sodium hypochlorite and also liberates hydriodic acid from potassium iodide as:

$$NaClO+HC_2H_3O_2=HClO+Na(C_2H_3O_2)$$
$$2KI+2HC_2H_3O_2=2HI+2K(C_2H_3O_2).$$

The hypochlorous and hydriodic acid react as follows:

$$2HI+HClO=I_2+HCl+H_2O.$$

The iodine and sodium thiosulphate react as:

$$2Na_2S_2O_3.5H_2O_3+I_2=2NaI+Na_2S_4O_6+10H_2O.$$

When the four reactions just given are examined, we find that one sodium hypochlorite gives one molecule of hypochlorous acid and that one molecule of hypochlorous acid liberates two atoms of iodine and two atoms of iodine react with two molecules sodium thiosulphate. Put in a graphic form this statement becomes:

$$NaClO=HClO=I_2=2Na_2S_2O_3.5H_2O$$

or

$$NaClO=2Na_2S_2O_3.5H_2O$$

or

$$\frac{NaClO}{2}=Na_2S_2O_3.5H_2O.$$

As the molecular weight of the thiosulphate is used to make a liter of N/1 solution, such solution would be equal to or represent one-half the molecular weight of sodium hypochlorite. The molecular weight of the latter is 74.46, and one-half of this is 37.23. One c. c. of the N/1=0.03723, and one c. c. of N/10=0.003723.

There is no good reason why the preparation of this solution should require more than three hours. Trial has proved this to be easily possible.

THE PREPARATION OF DAKIN'S SOLUTION AND THE CARREL TECHNIQUE IN THE TREATMENT OF INFECTED WOUNDS.

By W. N. McDONELL, Surgeon, United States Navy.

Ever since the publication of the wonderful results obtained by Dr. Alexis Carrel in the treatment of infected wounds at his hospital at Compiègne, surgeons in this country and abroad have attempted to obtain similar results by following his methods. Their efforts have met with varying degrees of success, depending on how closely they followed the Carrel technique.

Carrel's object in the treatment of infected wounds in the main is to obtain prompt sterilization of the wound and early subsequent closure. After experimenting with numerous disinfectants in conjunction with Dakin, he finally decided in favor of a sodium hypochlorite (NaOCl), which contains not less than 0.45 per cent nor more than 0.50 per cent sodium hypochlorite, and which is not alkaline to solid phenolphthalein. If the percentage of sodium hypochlorite is less than 0.45 per cent, the antiseptic power of the solution is too low; if greater than 0.50 per cent, the solution is irritating. If the solution is alkaline to phenolphthalein, it is irritating.

This is known as Dakin's solution. Many of the failures to obtain results with Dakin's solution are due to the fact that it is not properly prepared.

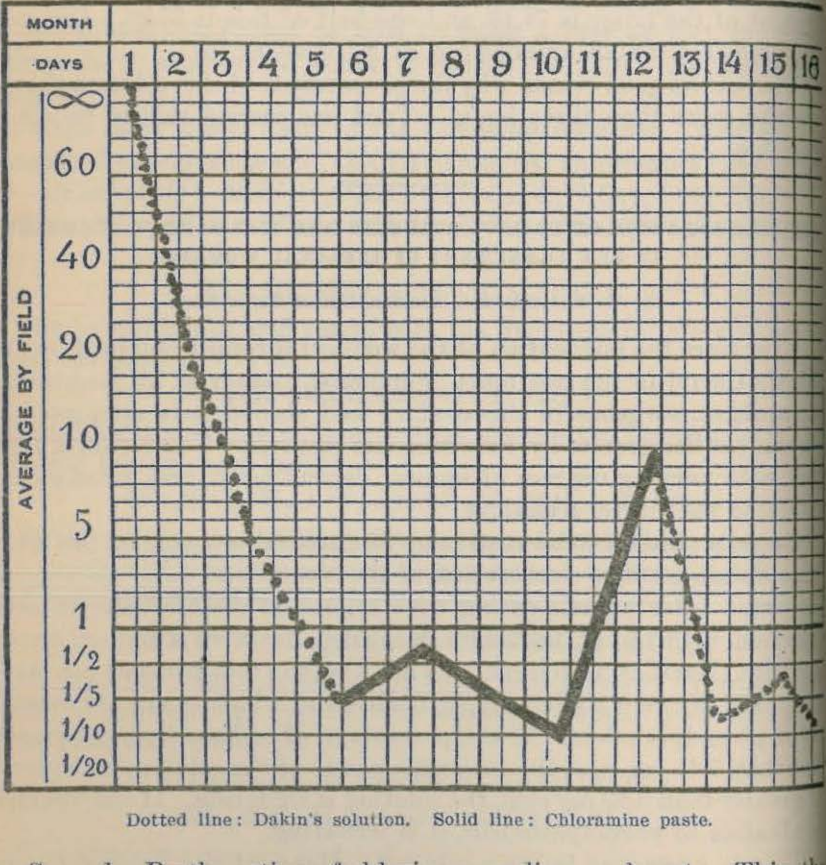
Dakin's solution may be satisfactorily prepared in several ways:

First.—By the electrolysis of a sodium chloride solution. This method gives a more satisfactory product, but requires apparatus and electric current that are not always available.

BACTERIOLOGICAL CHART

Name: .... *Ward:* ....

Nature of the wound Leg ulcer



Dotted line: Dakin's solution. Solid line: Chloramine paste.

Second.—By the action of chlorine on sodium carbonate. This, the most direct method, has hitherto been practically unavailable, becaus of the difficulty of measuring liquid chlorine. This disadvantag has, however, been recently overcome. The amount of chlorine used can be accurately measured with a chlorine measuring apparatus such as is used in measuring chlorine in the purification of water. (This apparatus is manufactured by Wallace & Teirnan, of New York City.) Liquid chlorine in 15–30 pound lots can be carried in containers weighing about 60 pounds, which would make it readily transportable on the field. Owing to the marked difference in the chlorine content of the different bleaching powders, two containers rarely titrating the same, this method would seem to be preferable for use in the field and aboard ship.

Third.—By the double decomposition of calcium hypochlorite and sodium carbonate. This method, the one first used by Dakin, has been, because of the ease of obtaining the necessary chemicals, the most available one. The alkalinity of the solution, after the precipitation of the calcium carbonate, may be neutralized either by the addition of boric acid or by the use of a mixture of sodium carbonate and sodium bicarbonate in the precipitation. In either case it is necessary to determine the percentage of available chlorine in the bleaching powder with which one is working.

Titration of bleaching powder.

Exactly 20 grams of bleaching powder, made up of small samples from different parts of the jar in order to obtain a uniform sample, are well stirred up in a liter of water. After standing a few hours (at least six hours) the supernatant liquid is decanted through a filter paper and a 10 c. c. sample of the filtrate is titrated in exactly the same manner as in the titration of Dakin's solution. In this case the number of cubic centimeters of decinormal hyposulphite required to decolorize is multiplied by the factor 1.773 to give the percentage of active chlorine.

The following table, by Daufresne, gives directly, according to the amount of active chlorine contained in the bleaching powder, the quantity of bleaching powder, sodium carbonate (dry), and sodium bicarbonate to prepare 10 liters of Dakin's solution:

Percentage in active chlorine, of the chloride of lime.	Quantities of ingredients to use for preparing 10 liters of Dakin's solution at 0.475 per cent of (ClONa).			Percentage in active chlorine, of the chloride of lime.	Quantities of ingredients to use for preparing 10 liters of Dakin's solution at 0.475 per cent of (ClONa).		
	Chloride of lime.	Dry sodium carbonate.	Sodium bicarbonate.		Chloride of lime.	Dry sodium carbonate.	Sodium bicarbonate.
	Grams.	*Grams.*	*Grams.*		*Grams.*	*Grams.*	*Grams.*
20	230	115	96	29	159	80	66
21	220	110	92	30	154	77	64
22	210	105	88	31	148	74	62
23	200	100	84	32	144	72	60
24	192	96	80	33	140	70	59
25	181	92	76	34	136	68	57
26	177	89	72	35	132	66	55
27	170	85	70	36	128	64	53
28	164	82	68	37	124	62	52

Example.

If 10 c. c. of the filtrate require 16.6 c. c. of decinormal hyposulphite the percentage of active chlorine is:

16.6×1.773=29.4 per cent.

That is, we require to prepare 10 liters of the solution—

159 grams bleaching powder.
80 grams carbonate of sodium.
66 grams bicarbonate of sodium.

If dry sodium carbonate is unavailable one should use 2.85 times as much of the sodium carbonate crystals; that is, 228 grams sodium carbonate (crystals).

The titration of Dakin's solution.

The percentage of sodium hypochlorite is determined by titrating with tenth normal sodium hyposulphite (thiosulphate) the amount of iodine liberated by a measured amount of Dakin's solution. The technique is as follows:

Measure 10 c. c. of Dakin's solution, using a bulb pipette, into a beaker or Erlenmeyer flask containing about 50 to 75 c. c. of water.

NOTE.—The disappearance of color is most easily observed when the volume of fluid in the vessel is between 50 and 100 c. c.

Add 10 c. c. of a 10 per cent potassium iodide solution and 2 c. c. of glacial acetic acid. Then run decinormal hyposulphite solution into the flask from a burette until the discoloration of the solution is complete.

The number of cubic centimeters of decinormal hyposulphite required to decolorize the solution multiplied by the factor 0.03723 gives the percentage of sodium hypochlorite. For example:

12.10 c. c.×0.03723=0.45 per cent.

13.43 c. c.×0.03723=0.50 per cent.

Test for alkalinity.

A few crystals of powdered phenolphthalein are dropped on the surface of 10 to 20 c. c. of the solution to be tested. Dakin's solution should remain entirely colorless. If there is any red discoloration the solution is too alkaline and must either be discarded or neutralized.

NOTE.—It is important to remember that the tests of Dakin's solution for alkalinity and for strength of sodium hypochlorite are entirely independent, but equally important.

Details for preparation.

Place in a 20-liter flask or bottle the amount of bleaching powder indicated by the titration and mix well with 5 liters of tap water. Shake vigorously and allow to stand for several hours (overnight).

Dissolve the designated amounts of sodium carbonate and sodium bicarbonate in another 5 liters of tap water in the morning or after 6 to 12 hours; pour the solution of sodium carbonates into the bottle containing the bleaching powder; shake well, and allow the precipitated calcium carbonate to settle. After half an hour siphon off the clear liquid through a double filter paper. The product should be perfectly clear and should be titrated for strength of hypochlorite and tested for alkalinity.

Preservation.

Since light greatly accelerates the rate of decomposition of the hypochlorite solution, it is best to keep Dakin's solution either in dark bottles or in a dark cupboard or an ice box. Daufresne has found that the addition of 5 milligrams of potassium permanganate per liter of solution exerts a markedly stabilizing effect. It is convenient to make a half per cent (5 grams per liter) solution of potassium permanganate and add 1. c. c. of this solution per liter of Dakin's solution. The color imparted by the permanganate does not interfere with the titration.

Preparation of N/10 sodium thiosulphate.

This solution must be carefully prepared, for upon its accuracy depends the accuracy of the titration of sodium hypochlorite. The sodium thiosulphate may be obtained in a pure form from any of the large chemical houses.

24.82 grams made up to 1 liter in a volumetric flask gives a tenth normal solution, 1 c. c. of which is equivalent to 0.003723 grams of sodium hypochlorite.

If it is anticipated that an accurate analytical balance will not be available, it is possible for one to carry either a small amount of standard solution or carefully weighed sample of thiosulphate, which may be diluted to the required volume as required. This would then serve as a standard.

For example.—A 24.82-gram portion, accurately weighed, is carried in a well-stoppered bottle and when required is carefully dissolved and made up to 1 liter in a 1,000 c. c. volumetric flask. A sample of Dakin's solution titrated with this standard N/10 solution in three titrations requires, let us suppose, 12.6, 12.7, and 12.65 c. c., i. e., an average of 12.65 c. c. The strength of sodium hypochlorite in the Dakin's solution is therefore—

$$12.65 \times 0.03723 = 0.471.$$

Titration of chloramine (chlorazene).

Titrate 10 c. c. in exactly the same manner as in the titration of Dakin's solution. Multiply the number of c. c. decinormal thiosulphate solution required to decolorize by 0.141 to give the percentage of chloramine.

Having prepared a satisfactory solution of sodium hypochlorite the next thing to consider is the preparation of the apparatus for instillation.

A. *Making of the instillation tubes.*

1. Take small rubber tubing of interior diameter of 4 millimeters; cut it into segments 30 and 40 centimeters long; ligate the tubes at one end with cotton thread.

2. Pierce the tubes with small holes with a special punching apparatus at intervals of from 5 to 20 centimeters from the closed extremity. The tubes 30 centimeters long are pierced over a length of 5 and 10 centimeters, and the tubes 40 centimeters long over a length of 15 and 20 centimeters.

3. Making of tubes with turkish toweling at perforated ends.

4. Making of a tube with a single opening.

B. *Distributing tubes.*

1. See that the four types of distributing tubes with one, two, three, and four branches are of the proper caliber. The inside caliber of the larger end of the tube should be about 7 millimeters, while the inside caliber of the branches should be 4 millimeters.

2. Glass connecting tubes.—Cylindrical tubes of 7 millimeters inside diameter and cylindrical tubes of 4 millimeters inside diameter.

C. *Irrigating apparatus.*

A flask holding a liter. The lower orifice of it should be about 7 millimeters in diameter. The irrigating tube, of red rubber, should be of the same caliber. The flow in the tube is controlled by a pinch cock. Testing the pinch cock to ascertain that the spring is strong enough to intercept the fluid.

Arrangement of the tubes in the wound.

1. According to the shape of the wound.—Surface wounds, "Seton" wounds, wounds with several openings.

2. According to the state of infection.—Use of the single opening tubes and the different kinds of perforated tubes depends on the condition of the wounds. Fresh wounds and suppurating wounds are treated differently.

Dressings.

1. Making of sheets for dressing.—The sheets are prepared in four different sizes. They are made of a layer of gauze, a sheet of absorbent cotton wool, a sheet of nonabsorbent cotton wool, and a sheet of gauze.

2. Preparation of vaseline compresses.

Methods of carrying out the dressing.

Every patient must be dressed in his bed. There must be no suffering during the dressing. When a patient cries during the dressing, it demonstrates that the technique of the surgeon is bad.

1. Wash the surface of the wound and surrounding skin with neutral oleate of soda, on a sponge of absorbent cotton without gauze. Then wash it with sterile water. Dry the surface of the skin with gauze compress, and protect it with pieces of gauze sterilized in yel-

low vaseline. The lower part of the limb should be protected, and not the part which is above the wound.

2. Put the dressing sheets under the limb, ready to be folded. Then select perforated tubes of the proper size and place them in such a way as takes into consideration gravity in order that every part of the wound be irrigated.

3. Fix the tubes with gauze, loosely packed.

4. Before closing the dressing test the working of the tubes by using a syringe. Then close the dressing sheets and fix with safety pins without using bandage.

Principles of the technique of the chemical sterilization of wounds.

1. Wounds received in warfare are grossly infected.

2. Conservation is only possible in war surgery in conjunction with a method effecting sterilization of these badly infected wounds.

3. Operation is only a preliminary step to the first dressing. Operation must be controlled by following the clinical and bacteriological examination of the wound.

Technique of the sterilization of wounds.

Two steps.—The first step of the disinfection is to obtain thorough opening of the wound and to remove contused and necrotic tissue. The second step is the chemical sterilization.

Bacteriological examination of wounds.

1. Instillation should be interrupted two hours at least before the secretion is examined.

2. Take a rigid platinum wire mounted on the end of a glass rod. Scrape lightly the surface of the wound in selecting the deep parts and the necrotic structures. Spread the secretion on a slide labeled with the name of the patient, his number, and the region of the wound whence the secretion is taken. Arrange the slides prepared during the round in a box for microscopic specimens.

3. Fix the smear in a Bunsen burner; place it on a glass support and stain it with a few drops of carbolized thionin; wash it with water, and put aside to dry.

4. Counting the bacteria.—Examine the preparations with a No. 12 immersion objective and a No. 3 eyepiece. Count the number of bacteria in 5 or 10 fields of the bacteria, and take an average. Record the number of bacteria on the bacteriological chart.

5. Causes of error.—Hemorrhage, necrotic tissue, and dry scabs,

Closure of wounds.

The conclusion of the sterilization is the closure. Time for closure. Primary closure should be deferred. Secondary closure depends upon two factors:

(*a*) Bacteriological examination.

(*b*) Clinical aspect.

It is well to close a wound as soon as possible. (Closures made before the eighth day contain no scar tissue.)

Before the twelfth day skin is not adherent.

When the bacteriological count of a wound is 1 bacteria to 5 or more fields for two days in soft parts, the wound can be closed.

In fracture cases do not close until bacteriological count is not more than 1 bacteria to from 5 or 10 fields for 4 consecutive days.

Suppurating wounds should show a bacteriological count of not more than 1 bacteria to 5 fields or more for one week before closure.

Clinically the granulation tissue should appear red and smooth and the secretions sticky and colorless.

Technique of wound closure.

(*a*) Strapping with adhesive.

(*b*) Elastic traction.

(*c*) Suture.

(*d*) Skin grafts.

Where there is extensive loss of skin, Carrel uses skin grafts.

Grafts of adipose used to fill longer cavities.

Strapping and traction used when wounds are closed before the twelfth day.

After the twelfth day use sutures, if possible, under anesthesia; the edges of the skin are removed and the skin dissected free from the underlying tissue and brought together. In using deep sutures the operation is divided into three stages:

(*a*) Introduce sutures.

(*b*) Continue sterilization for two days.

(*c*) Closure.

By following the above technique 80 per cent of fresh wounds can be closed in 10 to 12 days with adhesive.

Failures of closure are due to—

1. Reinfection of wound.

2. Closure without bacteriological examination. (Smears should be taken before closure.)

3. Using deep sutures in suppurating wounds and closing at once. (Sterilization should be continued after sutures are introduced.)

4. Extensive loss of skin.

Treatment of infected fractures.—(*a*) Recent, (*b*) old.

(*a*) Four kinds, dependent upon the aspect of the fracture. Treatment the same for the first 24 hours as that for wounds of soft parts. Time for operation.

Two steps of the operation: Treatment of the soft parts; treatment of the seat of fracture. Conservatism must be practiced in the removal of bone splinters, especially as to orthopedic fragments. Periosteum must be respected.

(*b*) At the time of fistulation.—The technique embraces the following points: (*a*) Primary disinfection. (*b*) Operative treatment. (*c*) Sterilization of the site of fracture. (*d*) Closure—filling up of the cavity of the bone with different pastes and fat tissues.

(*c*) Immobilization and continuous extension are necessary for the sterilization of a wound. With infected fractures the overhead apparatus is the only one that can be used in conjunction with instillation.

(*d*) The limb upon which continuous extension is applied is placed in a kind of hammock which is suspended from above and kept in equilibrium by weights. The counterextension is made by the weight of the lifted limb.

(*e*) In the treatment of mildy infected wounds and also in certain wounds that have been previously treated by instillation of Dakin's solution, Carrel uses chloramine (chlorazene) in the form of a paste which is made up in the following proportions:

Chloramine	10
Sodium stearate	70
Water	1,000

This dressing is renewed every 24 hours and will bring about and maintain sterilization in wounds of low-grade infection.

MUSINGS DURING AN AMERICAN CRUISER'S VISIT TO THE WAR ZONE.[1]

By C. N. Fiske, Medical Inspector, United States Navy.

During 8,000 miles of semitropical cruising from the placid harbors of its Pacific island peace-time station the big ship's personnel attempts to amalgamate its Hawaiian and California National Naval Volunteers with the more youthful but consciously more experienced regulars.

Conjecture occasioned by rapid mobilization and sailing under sealed orders with decks darkened after sundown gives place to anticipation as an officer in high repute for his perspicacity reports on board for command. Later one realizes that the country is assembling her forces for war as the ship hastily docks and rushes through certain emergency repairs upon passing through the most efficiently built and administered commercial and military handiwork of the world—the canal. Wonder and satisfaction inspire the feelings of all as the ship passing through mined nets finds herself in company with strange transports in the greatest Atlantic ports, and we finally have the certainty that we are soon to take our initial part in the struggle "to make democracy safe for the world."

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[1] This paper was prepared in June in connection with the first American Expeditionary Force. During subsequent cruises both within and outside the war zone it has been noted that most enlisted men of the volunteers have become thoroughly amalgamated with few reductions in rating and that the tension noted formerly in danger area has become relaxed to such a degree that resort to alarms has been suggested to keep the men alert. Officers seem thoroughly to appreciate the necessity for accomplishing the ship's missions and appear to shoulder more than their share of the responsibility.—(C. N. F.)

This is certainly not the place for the misfit officer or man who fails to appreciate that ninety-nine and more per cent of those on board mean business and have their country's interests firmly at heart, even though few or none can comprehend its destinies.

The naval militiaman soon finds that the "regular" (how new the word sounds in naval parlance despite the brief experience of '98) is willing to learn as well as teach, because at heart he doesn't think that he knows it all and comes to realize that the militiaman is not only prepared to make but is already manfully enduring sacrifices in an occupation which was in no sense his adventure as a "tin sailor" or his career in the sense of means for a livelihood for himself or his family. Propinquity occasions mutual respect and grows by leaps and bounds, and the safety of the convoy and expedition generally transcends the thought of personal safety.

Appropriately enough we bring from the Pacific our own censorship orders interpreted liberally rather than through the more rigid or restricted "health and comfort card," so easy to circumvent by designing enemies within, whom all are eager to detect though unwilling to believe in their existence in the naval service afloat. More than this, the doctors, members of the humane profession, were designated to censor the ship's personal mail and messages until the receipt of a fleet order forbidding their acting in such capacity. Who other than the doctor or chaplain is quite in the position or has the time to appreciate the undoubted facts of family relationships and the anxieties of those in humbler stations before the mast or behind the gun or stoking shovel? It is from acting as ship's censor that these musings took place after many hours consumed in scanning hundreds of pages of the innermost thoughts of typical American young manhood as it undertakes the serious responsibilities of war. Such an opportunity to hazard a composite of the psychology before the mast rarely occurs, and who shall say that this psychology differs materially in fundamentals from that more carefully repressed in staterooms and cabins? Such a composite, however, would be a mixture if not an emulsion, for there would emerge numerous incompatibilities.

Statistically the most prevalent comment has been due to elation on seeing so much of the world beyond the wildest dreams and to the regret that description of ports and shores must be deferred until censorship no longer forbids. Latterly it has seemed that the new-made sailor has been to a degree spoiled by a surfeit of so much sightseeing, with the result that if, from military considerations beyond his ken, liberty is impracticable in some port he is prone to forget that a joy ride and "opportunity to see the world" is not his prime raison d'être, and he is, if a volunteer, after justification of more patriotic motives by his first visit to the war zone, quite ready to return to sunny California. In this latter phase is apparent his homesickness, manifested more frankly as concern for supposed dependents in balmier climes. In many cases the worry is genuine and occasioned by reduction in rating and pay through inability to justify the advanced appointments bountifully or carelessly bestowed in the militia organizations. Another grievous disappointment is failure to receive promised credit for clothing outfit, or the failure of local beneficiary societies, private or municipal corporations, to live up to the prospectus published in the heat of early patriotic fervor. Still another source of regret is his failure to appreciate from the first the importance of registering an allotment to his dependents. He is still patriotic, thoroughly so, and delighted over his volunteer status in comparison with his associates at home registering for Army draft, yet nostalgia and satiety for travel prompt the vain wish to accompany home the few who are being disenrolled on account of dependents, noncitizenship, or undesirability, even at the risk of being considered "yellow."

The regular who, by the way, on deck can hardly be distinguished from the volunteer, accepts his situation philosophically and on the whole gladly. With him, the ship being "happy" and "feeding well" the only question usually is whether he might not have a better chance for action on a destroyer or in the gun's crew of a merchant vessel. He has by no means severed his home ties and inclinations and still looks forward to his 30 days' leave on reenlistment and frequently to a substantial portion of his four months' pay before reenlistment, but he would not grumble if either were denied him, readily assuming military exigency.

Inferences of fear of death are disdainfully resented on the part of all of the considerable number who refer to it, but there is a natural and abiding concern for the welfare of dependents. The fear of deformity or mutilation from wounds and preference for death commonly ascribed to soldiers in trenches is hardly mentioned and probably rarely occurs on shipboard despite some unavoidable assumptions gained through first-aid instruction. Probably the average man on board, though not consciously a philosopher, would subscribe heartily to the sentiments of Stevenson's "Aes Triplex," or to those of Montaigne; he would be grateful to be saved the trouble of interpretation and ask any "slackers" to read it. The greater number seem to possess, if not declare, a faith in the cause and an understanding of it as delineated by national expositors, yet there is a surprising absence of bitterness against the enemy except for its sovereigns and their advisers.

A quiet and stern enthusiasm for the safety of the mission (convoy) developed in lookout and gun watches as target practice came which reached its climax upon the first encounter. A photograph of the forecastle gun's crew in real action would have been worth a small fortune to Mr. Reuterdahl and realized the ideal of some of his portrayals. In no great-gun fleet action could the faces and attitudes of desperate readiness and execution be surpassed. At this time the first realization of war law came in the immediate advancement of one subordinate to gun captain because in an emergency he knew what to do and did it when his superior failed. War reward and punishment at once gave food for thought and efficiency took another spurt.

The restrictions in criticism imposed by censorship limit one's insight in that direction, but most seem to respect their shipmates and all, and especially seasoned marines, enthused over the commissariat. It is not unfair to say that the men's food was better prepared than that of the officers. Officers' messes have steadily declined in efficiency since Chinese stewards began to disappear. This suggests the advisability of designation by regulations of a permanent ex officio commissary officer to replace the bimonthly elected mess treasurer, which duty practically every officer avoids so far as possible.

A few represented that they had conscientiously tried to avoid getting on "report," and could not understand how justice could miscarry, but generally accepted the responsibility and obligated themselves to steer clear in the future, especially if fine or disrating involved financial penalties for those at home.

Criticism of those without the ship in the ordering of the circumstances and details of her mission seemed far more prevalent among the officers who felt that, though lacking many essentials of information of existing strategy and tactics, the problems were ones on which some had put much thought and which might be their own at some future time. Inquiries and comments were earnest, good-natured, constructive, and charitable from ignorance of premises; they were undoubtedly commendable, though for the time being necessarily ineffective. Recent departmental encouragement of suggestions looking to a prompt and successful termination of the war has not appealed to the critics because of their lack of time and data.

Interest in the daily radio news was quite marked for the first few weeks, but gradually the feeling that, if anything, it was more "doped" than the newspapers has led to indifference.

Magazines and review periodicals are seized upon with avidity when at sea, those collected by the medical officers for the sick quarters being read continuously, however poor the light. More news and popular fiction journals could be used in the crew's reading room, and all possible material of this kind should be collected to turn over to crews abroad each time opportunity offers. The want of weekly and monthly news reviews is especially felt by men on the smaller ships.

There having been no casualties out of the ordinary and but 1½ per cent of sick, observations pertaining more strictly to medicine, hygiene, and sanitation are reserved for the annual sanitary report. Three-fourths of the physical disability has been contributed by the Volunteers, who constitute but half the personnel. Only seven cases of venereal disease (none syphilis) followed liberty in Paris and a French port. The only other suggestion I have to make at this time is that commanding officers be authorized to return to mobilization stations for disenrollment on account of undesirability or *unfitness without prejudice* the same per cent of Volunteers per quarter as has been the rule for discharge of Regulars. Less than 1 per cent of misfits has been found, but for them the delay in obtaining departmental authority should be obviated in view of brief and uncertain stays in home ports.

HISTORICAL.

THEODOR KOCHER, 1841–1917.

At the editor's request Dr. Arnold C. Klebs, of Washington, D. C., has prepared the following very interesting and comprehensive characterization of the great master of surgery, who died in his native city on July 27, 1917, after a life of incalculable usefulness to the world. Dr. Klebs' sketch possesses a special interest and charm as coming from the pen of a former pupil of the great teacher.

Kocher's great success, it seems to me, is mainly due to his well-balanced utilization of the results of painstaking scientific research. He never approached any field surgically that he had not explored beforehand anatomically, physiologically, by experiment, and the statistical method. Probably no other surgeon has demonstrated so successfully and in so wide a field the possibilities of the inductive method for practical work, and the generous acknowledgment by another master in surgery, von Bergmann, in saying that from no one had he learned so much as from Kocher testifies to the appreciation of this success by his peers. But it is the rare blending in him of theoretical and practical aptitude which characterizes every step of his life work. Added to this he possessed a wonderful gift for clear expression, inducing his hearers to think and reason with him and to reach conclusions with almost mathematical precision. While his mastery of operative technique and his dexterity have brought him probably the greatest number of admirers, it is the intellectual penetration of the problems before him and their lucid demonstration in the clinic and in the literature that will ultimately determine his historical position.

The astonishing universality and versatility of his genius in devising basic experiments which logically and inevitably had to lead to definite operative measures or to conservative procedures made the strongest possible appeal to his students and promoted in them habits of thought and of action which have become the stamp of Kocher's school throughout the world. To appreciate the full meaning of this, one has to have seen him at work in his clinic. One can obtain an idea of it by a perusal of his "Operationslehre," which also shows how successfully he brought to bear his artistic talents to the illumination of his subjects.

There can be no doubt that Kocher has made solid contributions to what may be called the tactics of surgical practice, to the refinements of aseptic technique, to hospital construction, etc. He has helped to make it possible, as Tavel jokingly pointed out, that "one may operate like a bootmaker and still all comes out all right, provided the asepsis is correct"; an impressive achievement indeed, but by itself no claim to lasting fame. Its undue emphasis only beclouds the radiant lesson to be learned from Kocher's life work, which was equally brilliant on the conservative side of surgery. His unstinted support of his pupil Rollier in his heliotherapeutic management of surgical tuberculosis on a large scale is only one case in point. And also in his operations he exercised conservative restraint, ever mindful of the Hippocratic admonition "nil nocere primum."

As regards Kocher's position as academical teacher and practitioner it has often been a subject of wondering comment outside of Switzerland that he persistently refused to accept most flattering calls to more extended and remunerative fields of activity. This faithfulness to the paternal soil he shared with several others of his colleagues who none the less achieved international distinction. The same as Kocher, Socin, Reverdin, Kroenlein, Roux found at home the most favorable and congenial surroundings, just as more than a century before the great Haller had given preference to the modest opportunities of Bern by refusing brilliant offers made to him by the King of England. The proverbial love of the Swiss for his country explains only in part this apparent anomaly in an age of intensest progressiveness. Though warmly devoted to the interests of his country and his town, his aims and his attitude were supernational; and nowhere in the world were so many natural advantages combined for the free promulgation of this attitude as in Switzerland. Its geographical position, its own ethnic composition, its entire disinterestedness in world politics create an ideal milieu for an escape from the narrowing influences of purely nationalistic aspirations. Kocher not only sought an escape from these restraining influences, but from his favorable vantage point was untiring in his exertions on behalf of the common aims and ideals of scientific medicine everywhere. His election to the first presidency of the International Surgical Association, which met in Brussels in 1904, expressed fittingly that his endeavors in this direction were widely appreciated. At the present moment, when international relationships even in scientific fields are so profoundly disturbed, this side of Kocher's manifold endeavors assumes a peculiar significance and perhaps contains a germ of hope for the future. (A. C. K.)

Sir Berkeley Moynihan, in the British Medical Journal, August 4, 1917, says: "With the death of Kocher the world loses its greatest surgeon." Another contributor to the same periodical designates Kocher one of the great makers of surgery of the nineteenth and twentieth centuries.

Dr. Harvey Cushing, speaking before the International Congress in London, 1913, said: "The accurate and detailed methods in the use of which Kocher and Halsted were for so long the notable examples have spread into all clinics—at least into those clinics where you or I would wish to entrust ourselves for operation. Observers no longer expect to be thrilled in an operating room; the spectacular public performances of the past, no longer condoned, are replaced by the quiet, rather tedious procedures which few beyond the operator, his assistants, and the immediate bystanders can profitably see."

Kocher was the "slow, careful, precise, and absolutely skillful operator, a typical scientific surgeon who obtains the completed clinical history of his patients before beginning and with whom success is an almost foregone conclusion."[1]

Lieutenant Colonel Lynn Thomas, C. B., C. M. G. (Cardiff), says: "I have seen surgeons on the Continent and in America who could operate with more speed, but I have never seen one whose judgment was so sound in the performance of daring operations where risk to life arose."

Moynihan says: "No one who ever saw him operate in a case of severe Graves' disease would ever forget his tender care, his exquisitely gentle touch, and the deft, light movement of every finger. When everything was finished the stainless towels round the wound failed to reveal the fact that an operation had taken place. Such an operation—indeed every operation Kocher ever did—was a supreme exhibition of what perfect anatomical knowledge, a blameless aseptic conscience, the most practiced technical efficiency, unfaltering courage, unruffled calm, and the most exquisite gentleness could accomplish. He was a slow operator, but there was never a moment wasted. To do an operation as he thought it ought to be done, time was necessary. Those who were privileged to see his patients in his private clinic or in the public hospital will agree that no patient suffered from such an expenditure of time as Kocher found necessary. He never wasted an instant, he never had to hurry, everything fell out according to plan, and the most sensitive tissue could hardly have been conscious of anything but a caress. Infinite accuracy, infinite care, infinite patience gave him results as near to absolute perfection as it is possible for surgery to go."

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[1] Garrison: History of Medicine. Philadelphia, 1914.

Theodor Kocher was born in Berne, and at 31, after an extensive period of study, following his graduation there, he assumed the chair of surgery in the university of his native town and occupied it with supreme distinction until his death. He had prepared for this position by further study in London, Paris, Berlin, and Vienna. He was a pupil of both Von Langenbeck and of Billroth.

Looking back over his career, one is astonished by the range and variety of Kocher's achievements. Lord Lister's accomplishments in antiseptic surgery, based on the work of Pasteur, were achieved just about the time that Kocher entered upon his duties in the surgical clinic of Berne, and he immediately adopted the method recommended. In association with Professor Tavel, the bacteriologist, he developed a technique which enabled him successfully to enlarge the scope of his work in bone surgery, particularly the resection of joints. He was a pioneer in the field of abdominal surgery and was one of the early operators in Switzerland to have success in the operation of ovariotomy, first performed in that country by Sir Spencer Wells. Kocher was perhaps the first surgeon in the world to make any serious and successful attempts to employ antiseptic methods in oral surgery. This was in connection with his operation for carcinoma of the tongue. One element of Kocher's success was his utter simplicity, his lack of egotism, his willingness to learn from others. Though the author of successful operative methods in many fields, he was always prompt to recognize the superiority of other procedures. Thus he abandoned his method of removal of the tongue in favor of the Syme operation, and in the same way adopted Bassini's operation for hernia instead of his own.

He was vastly more than a mere man of hand skill. His studies in coagulation of the blood and arrest of hemorrhage were made from the chemical and physiological standpoint. He was profoundly versed in anatomy and a persistent and practical student of pathology. As a writer he was prolific, the topics covered ranging from gunshot wounds, genito-urinary disease, bone surgery to intracranial pressure, herniotomy, goiter.

Perhaps it is in connection with the thyroid gland that Kocher is most widely known. By March, 1912, he had performed 5,000 operations for goiter, but it may well be doubted if to the medical profession at large his service in this field will be as lasting and as universal as that afforded by the method he originated for the reduction of the subcoracoid dislocation of the shoulder and brilliantly demonstrated publicly for the first time at Billroth's clinic in Vienna on a case of old unreduced dislocation after every previously known method had been tried in vain.

Besides his greater and more conspicuous talents, Kocher possessed some artistic ability and considerable mechanical ingenuity.

The former gift increased his lucidity as a teacher, and by means of the latter he devised many useful instruments, such as retractors, forceps, etc., now in general use.

Kocher's capacity for work was enormous. He entered on the duties of the day at 8 in the morning and did not rest until late in the afternoon. He taught, wrote, studied, did autopsies and laboratory work, and operated daily, besides holding consultations and conducting a large private practice.

In personality he was charming. His manners were gentle and courteous. He had a rich fund of quiet humor. At home he was affectionate and kindly. In the school he was patient and considerate with the honest, laborious student, however stupid, but the ignorant, lazy, and indifferent he could not brook.

By the death of Theodor Kocher the world loses a genius but one wholly free from the foibles which are popularly connected in thought with that title. He was great for many things, but perhaps most strikingly for that rarest combination, a grasp of large issues with infinite capacity for small detail. (ED.)

EDITORIAL.

ESPECIALLY A MEDICAL OFFICER.

The attention of all medical officers is called to the Naval Digest, 1916, as a volume containing much interesting information, a considerable portion of which is indispensable for anyone who is liable to serve on general and summary courts-martial and has the ambition to dispense something better than the rough justice of the police court type.

Pages 335 to 345 contain important decisions and constructions regarding "line of duty" and "misconduct." Other interesting headings are "desertion," "drunkenness," "duty," "dying declarations," "jeopardy," "self-incrimination," "conduct unbecoming, etc.," "hearsay evidence," "jurisdiction," "epilepsy," "hypothetical questions," "resignations," "expert witnesses," "manslaughter."

The selected decisions of the Secretary of the Navy and the opinions of the Judge Advocate General, with the references to both civil and military cases, embody a mass of material of the highest interest to everyone in the service.

In a hurried review of this volume one phrase happened to catch the editorial eye and started a long train of reflections, such as would probably come to every medical reader. They are outlined here simply because the volume in question may not be immediately accessible to all the readers of the Bulletin. "Every naval officer, and especially a medical officer, whose use of intoxicants is carried to such an extent that his superiors cause him to be tried and who is convicted of drunkenness on duty should be sentenced to dismissal from the Navy, and such sentence should be inexorably carried into execution. Whatever charity or assistance may be extended to such officers should be given when they reach some other walk in life than the naval service. They are worthless members of their profession and should in every case be forced off the list of officers of the Navy."

It is not the intention of the writer to offer any criticism of the phrase "especially a medical officer," but rather to suggest it as one which every member of the Medical Corps should keep in the back of his head at all times and under all circumstances, because whatever becomes an officer and a gentleman should be the peculiar attribute of a medical officer, and because whatever is not in harmony with the most exemplary behavior will indeed be most conspicuously bad in a physician. It is with no purpose to comment on the technical and legal correctness of the phrase in question that it is quoted, but rather to accept it in a broad sense, to rejoice in it and to find therein something inspiring and exalting, taking it as the index of a universal underlying conception of what a physician is or should be. A drunken doctor might poison some of his patients, or be guilty of malpractice on a score of men, and in the event of some serious catastrophe might be incapacitated from rendering adequate professional services when an even larger number of patients required assistance. Whether the doctor's power to do harm through intoxication is greater than that of the officer in the line of command with authority to direct and control all the activities of the life of those under him; is greater than that of the officer of the deck on the bridge during a storm or during an engagement, than that of the navigator, chief engineer, or captain, liable, if intoxicated, to jeopardize the ship and its whole complement, is for the law to decide. The legal opinion in question is probably based on entirely different considerations which more than offset the above facts. The line officer within the sphere of his profession is an all-around man whose training makes him at once navigator, engineer, and ordnance officer, even though to increase his efficiency he may specialize in one of these lines. Should the navigator, engineer, or other responsible line officer therefore be incapacitated from duty he can be replaced in a measure by some other individual on board. The doctor stands alone. He is without substitute. When he is incapacitated there is no one to take his 24-hour watch. Should he jump overboard or blow out his brains or be put in his bunk in a stupor, the personnel of the ship can receive only the most primitive and rudimentary medical and surgical treatment, no matter what exigencies arise.

It is perhaps in virtue of these peculiar and distinctive features that his conduct assumes such importance in naval law. But there is something more. From time out of mind the physician has stood high in the respect and affectionate regard of the community, ranking "with but after" the clergyman, while in the early life of the human race the functions of priest and healer were performed by the same individual. The most outspoken critics of the medical profession sometimes cynically ascribe the respect in which doctors are commonly held, the unquestioning obedience which they usually command, and the not uncommon disposition to dogmatism on their part to the influence of this primitive association of religion and medicine. Be that as it may, the fact remains that in most communities the leading physicians inspire general respect and confidence. They are accounted members of the learned professions and numbered among the prominent citizens wherever rectitude and intelligence rather than financial standing are the criterion of worth. Less openly and categorically religious than the minister, he is reputed less mercenary than the lawyer, for, however pleased and eager he may be to pocket the occasional big fee, the average physician is, in an unobtrusive and quiet way, the most universally charitable of men, answering every call and giving his services first and leaving the amount and the collection of his fee undiscussed, so that to a large proportion of his patrons the payment of it seems a matter of secondary importance and to insist upon it an unpardonable offense in the doctor.

The doctor on a ship stands alone, and from being especially conspicuous it follows that he must be especially circumspect, not only for his own sake but because he represents on that ship the whole Medical Corps, and because as his reputation gains or suffers the reputation of the entire medical profession gains or suffers as well. We decline, therefore, to take issue technically with the legal pronunciamento cited above, but joyfully accept it as a recognition of the moral obligation resting on the physician to live, not by a standard established relatively to that of his associates but rather by an absolute standard independent of practices or traditions, based on immutable principles of uprightness and duty.

THE STONE WHICH THE BUILDERS REJECTED.

Every now and then a cover with a strange title makes its appearance among the periodicals accumulated on the desk. No. 4, volume 19, of the Star-Bulletin, published by the inmates of Sing Sing Prison, is largely devoted to advocating that convicts be drafted into the military forces of the United States for the present war. The picture on the cover is in itself an argument of some force. Columbia, with a rifle in her hands, stands between a slacker hiding behind a woman, on one side, and a prisoner with broken shackles reaching for the weapon, on the other.

At first blush the thought of enlisting men who bear the stigma of the penitentiary is revolting. For years military authorities have protested against the too frequent practice of certain police magistrates who offer to a culprit the choice of a fine and a workhouse sentence or of enlisting. Such action has been resented on the ground that the Army and Navy were not organized as reformatories, and the objection still holds good.

In the present instance, however, the proposition is very different. The force of some of the arguments advanced in the pages of the

Star can not be admitted, but there is something to be said in favor of the main contention. The fact that John Bunyan composed The Pilgrim's Progress while imprisoned on account of his religious views, and that Socrates, Galileo, and a host of statesmen, philosophers, scientists, and writers suffered death or durance vile because their opinions were not in harmony with the prevalent ones of their day can not be adduced in palliation of offenses committed against moral and criminal law about whose importance there has been no difference of opinion from the earliest times. Murder, rape, and the unnatural crimes have always been held in horror by the state and the individual and always will be. What exact degrees of misconduct and what violations of law should exclude enlistment we will leave to the lawmakers, who would in any case have to modify the present legal restrictions governing enlistment.

We must, however, recognize the great changes as to methods of punishment which have come with advances in civilization. Even up to the seventeenth century the list of offenses which entailed the death penalty was an appallingly long one and included many relatively trivial things. To us who live in a land of free speech and an unbridled press it is almost inconceivable that men used to have their ears cut off, their eyes gouged out, etc., for irregularities of conduct that to-day would excite little more than an unfavorable comment in a newspaper or a letter of protest from one of its subscribers.

The object of punishment being twofold, to discourage crime in others and to restrain or reform evil propensities in the punished, the law should be satisfied if both conditions are fulfilled, but we know that in actual practice the law is content with much less, because the reformatory function of our prisons is limited indeed. We are satisfied in the main to consider that a debt against society has been discharged when the legally imposed punishment has been carried out. Should the needs and circumstances of society at large be at any time so modified as to permit the culprit to fully discharge his debt by some other method than that of undergoing imprisonment, then society would be justified in permitting the liquidation of the debt by that other method if it also provided a wholesome lesson to those inclined to sin. A man meditating a crime knows that he incurs a serious risk to life. No man can go to war, to such a war as the one now convulsing the world, without realizing that in so doing he puts his life in jeopardy and faces what is perhaps worse than death, the possibility of detention in a German camp for prisoners.

If by undergoing his legal punishment the offender's debt is paid, then, when he leaves the prison, he should be square with the world. If, when he has paid his debt, society refuses him the rehabilitation which represents, as it were, a receipt for the payment he has made, then the situation is reversed and society becomes his debtor instead of his creditor. As to the complete rehabilitation of the time-expired man there can be no two opinions. Society looks askance at the discharged convict and points the finger of scorn at him. The employer turns him away from his shop with scant civility, and unless he has been a robber of millions the door of the drawing-room is closed against him. Let such a man publicly seek the confidence of the community and no matter what standing he may deservedly have attained in it the faintest whispered reference to his past puts him at once outside the pale. And yet we know that, however fallacious as a system of reformation imprisonment may be, many of the men branded as irredeemable sinners had and still have much good in them; many of them fell through momentary weakness and they leave the prison walls not only with good intentions but with purposes implanted on real moral growth. If circumstances were favorable they would regain all that they have lost and would surpass in useful achievement many men whose souls have never been purified in the flaming crucible of sin and retribution.

Society's greatest difficulty in properly handling the criminal is to provide favorable conditions for his rehabilitation. Life in its ordinary course does not furnish to sinners in whom the good is struggling to surmount the bad the needed opportunity to demonstrate the survival of the original good and its increment of gain and so to win the confidence and trust indispensable to further advancement and accomplishment. We have no suggestions to offer as to the measures which could be adopted for this purpose in ordinary times, but it is clear that just now the life of our people is profoundly altered, as is the life of millions of others with whom we are in touch socially and politically. The great upheaval of universal war is affecting individual fortunes, position, and character. Standards are being remolded, values reestimated, social barriers lifted. Throughout all time war has been the great leveler. It brings down kings from their thrones and raises men of low degree to the highest pinnacles of honor and power. True merit, however modest its garb, comes to the front, and incapacity, stripped of its trappings and caparisons, drops to its proper level. In the general fermentation of affairs which accompanies experience of sorrow, distress and want, due to war, we rewrite the lists of our friends, our eyes are opened to see virtues where we least expected them and we even find that those most to be trusted are among the outcast and the despised. We may look in vain for courage, fidelity, and patriotism to the sources from which we have been wont to demand these qualities, and discover them blossoming in beauty from a soil as rich in the essentials of courage, steadfastness, and loyalty as it is black in outward appearance.

If we regard the criminal as having incurred a debt to society it is inconceivable that circumstances could ever arise so fertile of opportunity for the liquidation of that debt as those of the present moment. We have embarked upon a war which must inevitably affect in a profound and unusual degree every inhabitant of the country. If we are to carry it to a successful issue, it can not be fought by a military class. In our case this would be a limited and one-sided effort and prove our undoing by implicating us without giving the guarantee of victory. Every energy must be called into play, and if we have any realization of what lies before us in the struggle we can not afford to spurn any real and legitimate help nor allow thousands of able-bodied men eager to help to remain in the unproductive class. Even though we declined to consider the possible right of the convict (a man may forfeit his citizenship, but what power of law can eradicate from the human breast a love of country and the triumphing sense of obligation to it), can we decline to utilize any and every justifiable measure for the attainment of our purpose? The man who seeks military service in spite of a sinful past and a long period of sequestration from his fellows in the full consciousness, on the one hand, of his physical security within prison walls and of the shadow that will rest upon him at the front until he has made good, and, on the other, of the incalculable hardship and suffering which his military service will entail even if it does not involve the loss of his life, should be considered for enrollment.

So much for sentimental considerations, which we believe will find acceptance with the majority of our citizens, who naturally and most pardonably would close the discussion at this point. To the criminologist and to the medical officer of the Government, however, who may have shown a freedom from prejudice by consenting to the general proposition hitherto advanced there presents itself now the most difficult phase of the question. What shall be the principles on which enrollment shall be conducted and what shall be the type of duty assigned to the men who are to emerge from the shadow of the prison?

For a number of years the medical officers of the Navy have been endeavoring to reduce to system and formula the exclusion from the service of the mentally unfit. It will be manifestly absurd to put medical officers to work in training camps and recruiting offices to weed out defectives and potential criminals on the one hand (and there has been recently an increasing pressure from the outside to make this exclusion more complete), and on the other to accept from our penitentiaries those whose conduct has given practical demonstration of their undesirability for military duty on account of instability of temperament and limited capacity for that strong inhibition, without which discipline is impossible and barbarity a certainty under the strain of campaigning. It would be something more than puerile to reject at the recruiting office the epileptic liable in a fit to fall down a hatch or get in the way of machinery and to receive the man whose diseased brain may lead him to slay his messmate through ungovernable rage over a trifling affront.

We have alluded in another paragraph to the distinction between types of offenses, and this should be significant chiefly, as it refers to the cause of crime. Dally, after studying the subject for 20 years, reported that criminals subjected to autopsy after execution showed, in every case observed by him, evidences of cerebral injury. Our standards must be both anatomical and physiological and above all psychological, and we must distinguish the relapser, the habitual, incorrigible, congenital criminal from those occasional criminals "who do not exhibit or who exhibit in slighter degrees the anatomical, physiological, psychological characteristics which constitute the type described by Lombroso as 'the criminal man'" (E. Ferri). These occasional criminals "are in a special degree a product of physical and social environment which has persistently driven them into criminal life by their abandonment before and after the first offense, and which especially in the great towns is often forced upon them by the actual incitement of their parents" (Ferri).

Again, at a time when the long practiced endeavor of Government agencies toward increased morality in Navy and Army is being powerfully reinforced by civilian agencies it would be highly undesirable to incorporate in our fighting force men convicted for rape, sodomy, indecent exposure, who would not only have a disastrous influence upon their associates, but would find in war conditions abroad increased incitement to and unusual opportunity for fresh sin.

Personally we are in favor of enrolling both the feeble-minded and the criminal, but for distinctly graded service. To the fighting forces we would assign the honorable élite of such able-bodied prisoners as gave promise of reform, based on a study of (1) the nature of the offense, (2) the history of behavior during confinement, (3) the results of medical examination by experts. Another class would be available for many forms of manual labor at home, in mines, forests, industrial centers, and, finally, those for whom the safety of society demanded the strictest surveillance would make shoes, clothes, haversacks, belts, and the countless other necessities of soldiers, regardless of the protests of this or that industry. We can not afford, at a time when the excuse for fabulous prices is given as shortage of food, lack of labor, etc., to maintain in comparative idleness men who have broken the law, while the honest, upright citizen is driven to endure hunger and increased taxation. We should not heed the howls of those who would fatten off the perils of the Nation, who report that the crop of peas, for instance, is smaller than ever, and put up prices on that account, though there is reason to believe that the canners have increased their output of canned peas by a million cases; who would conceal the nutritive value of Government-inspected oleomargarine because dairymen would complain, though already unable to meet the demand for dairy products.

Because a recruit is constitutionally unfit to endure the shock of battle does not mean that he can not be of service, and we could give these feebler folk a uniform and a task at home commensurate with their abilities, just as we make boy scouts of the eager lads not yet physically mature for marching and the exposure of the trenches. This is in line with the suggestions regarding tuberculosis suspects outlined by Dr. Arnold C. Klebs in his article Tuberculosis and Military Organization (U. S. NAVAL MEDICAL BULLETIN, Vol. XI, No. 4).

In the matter of *food* conservation and economy (the source of energy) the country is doing a great deal and the work is conducted by civilians. In the matter of conservation, economy, and utilization of *energy* there is room for infinite endeavor, and this should be planned and conducted by civilians. In our present critical situation the patriotic citizen, the patriotic professional man, the committee, the society, the league should not aspire to substitute or rival the existing instrumentalities of government working on lines for which they are trained, and in technical fields with which they are familiar, but rather should devote themselves to the development and expansion of new activities.

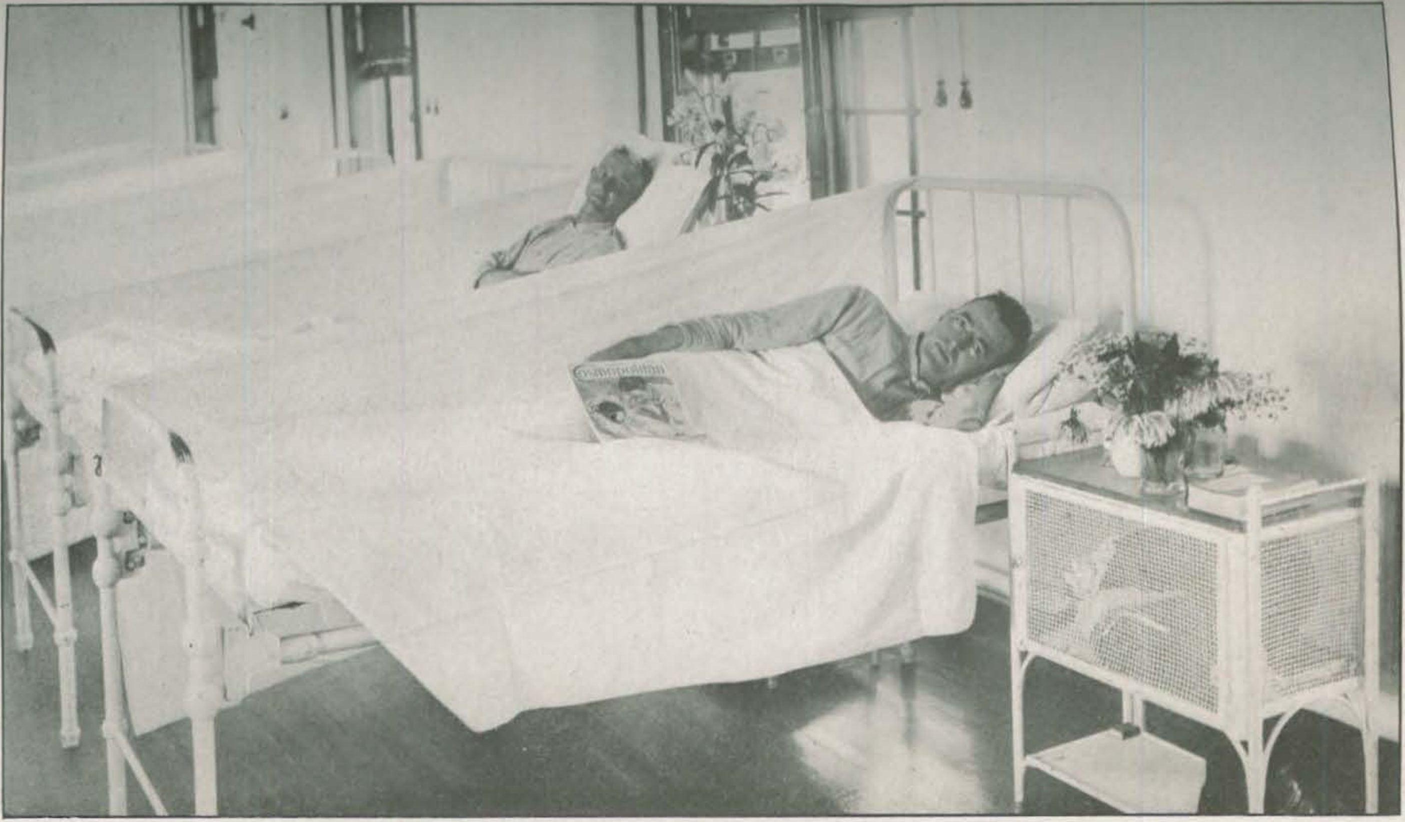
To the lawyers, criminologists, psychiatrists of the country we respectfully submit the problem of drawing up and putting into execution a widely comprehensive scheme for the immediate tabulation, classification, and systematic utilization for war purposes of the physically, mentally, and morally feeble of the State, who all have a capacity for service which, if properly directed, is enormous in the aggregate. To the men fitted by special knowledge and position to undertake this task we appeal for a display of the same patriotism, the same perseverance, the same courage and indifference to personal loss which characterizes our men at the front. We suggest that they proceed to a census of the criminal or prison class and of the feeble-minded of the country, dividing them into three categories: 1, For the front; 2, for heavy manual labor, under guard, if necessary; 3, for industrial employment. We would put class 1 into Army and Navy uniforms and classes 2 and 3 into distinctive uniforms, which would show at a glance that, whatever their previous disabilities or present limitations, these men were doing their bit for their country.

In our enthusiastic desire for an efficient personnel we are in danger of straining at a gnat and swallowing a camel, of requiring physical perfection for all forms of duty when only certain employments require such perfection, of exempting men from military service as though military service could be rendered only in the trenches. In point of fact military service includes a score of diverse forms of effort analogous to, nay, identical with, work being done in civil life. Whenever some factory hand is rejected for military duty because of a physical defect which has not interfered with his earning a wage in the factory and identical work is needed in the theater of war a fighting man must be diverted to work which the rejected or exempted man could have performed perfectly. It is not enough therefore to expand our forces numerically in order to win unless our capacity for numerical expansion is unlimited and we are utterly indifferent to the price we are to pay. There must be such intelligent expansion as will secure the utilization of every available working unit through classification of material and appropriate distribution of duties. Without this there will ensue a fearful waste of energy, and to our shame be it said that hitherto as a people we have been wasteful beyond all others.

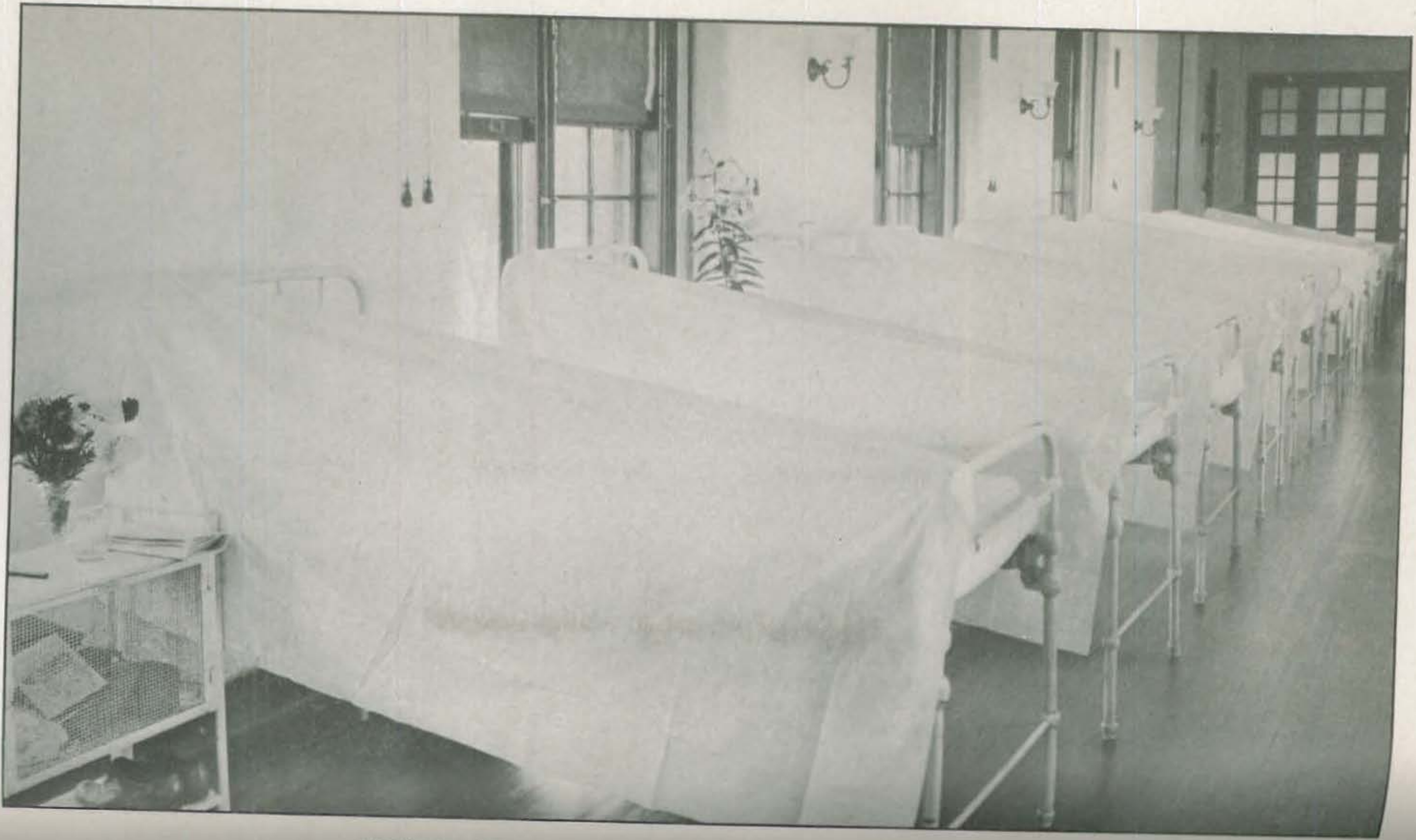
Without having had any very active participation as yet in the fighting we are already feeling the pinch of economic disturbances and squirming under it, and some of us realize that the pressure of financial problems will become almost unbearable as time goes on.

One of the causes of the universal rise in prices is ascribed to shortage of labor. Does this shortage actually exist so far as ordinary industries are concerned? We believe that to some extent the shortage of labor in various forms of civilian enterprise is due to the high prices paid for labor in urgent Government enterprises. To what extent could this be remedied by drafting to perform Government industrial service men incapable of fighting-line service, and by paying reasonable wages, higher than the wage of the poorly paid fighting line but below the enormous emoluments generally demanded? Soldiers will always be underpaid, even by the United States, the most generous employer of them, for endangering their lives, because their numbers are such that proper remuneration for the risks they incur would break any Government. On the other hand, the relatively small number of skilled artisans can compel better wages, but there should be a limit to what they are allowed to demand, and as competition and the laws of supply and demand are the fundamental factors that determine wages, we must see to it that no considerable number of able-bodied men remain idle. Let us therefore empty the prisons and devise a system by which every offender shall henceforth contribute work for the benefit of the Nation. That such a step will liberate a by no means insignificant army of potential workers is manifest when we remember that in 1910 the number of persons, including juvenile delinquents, committed to jails, prisons, penitentiaries, and reformatories in the United States reached a total of 479,787.

It is certain that we shall have to resort to many unusual methods before victory is won, and it is indispensable that we plan now, even if we can not yet actually initiate, changes in administration, which, however radical, can scarcely be more novel or startling than what has already come to pass—conscription for military enterprises conducted 3,000 miles from home.



BEDSIDE SCREEN IN USE AT NAVAL HOSPITAL, NEWPORT, R. I.



BEDSIDE SCREEN IN USE AT NAVAL HOSPITAL, NEWPORT, R. I.

SUGGESTED DEVICES.

BEDSIDE SCREEN.

By M. F. GATES, Medical Director, United States Navy.

The accompanying illustrations show a bedside screen curtain which I have used at this hospital for several months.

The screen consists of a plain piece of bleached muslin, hemmed at each end, and with a "header" at one side. Through the header is run a piece of white line. To one end of this line is secured an ordinary brass picture hook of light metal. This hook is caught over the foot rail of the bed. The other end of the line is secured to the head of the bed at the junction of the first upright rod with the tubular frame, either by a slip knot or a light hook, in such a manner that the end of the screen comes slightly around the head of the bed. The tension is such that the picture hook can be readily slipped from the foot rail and the screen thrown over the head of the bed or removed entirely, as may be desired, when necessary to work at that side of the bed.

The screen is placed on one side of the bed only. It therefore does not interfere with the patient getting out of bed nor with ordinary care being given by attendants. The use of this screen gives some privacy to patients, while not interfering with the general supervision of the ward by nurses. It conduces to cleanliness and lessens the chance of infection being conveyed from patient to patient by coughing. It also individualizes the bedside locker, which otherwise is frequently used by patients in adjoining beds, and prevents the accidental or careless use in common of drinking glasses and other articles which are placed on the stand. Its use in the naval hospital, Newport, R. I., has proved very satisfactory.

A SMALL STETHOSCOPE BELL.

By E. F. DU BOIS, Assistant Surgeon, United States Naval Reserve Force.

The hard-rubber Hollis stethoscope bell used by most of the profession in New York has excellent acoustic properties but certain mechanical disadvantages. The bell, with its holder, is so long that one can not thrust it beneath a patient's clothing or under the back of a man too sick to turn in bed. Several years ago Dr. W. Gilman Thompson devised a small bell with large caliber tubing and Dr. George Draper modified this by adopting the shape and size of the Hollis bell. About nine years ago the writer, in turn, modified the Draper stethoscope and bent at right angles the tubes to which the rubber is attached. This makes the stethoscope as handy as the Bowles model. It is particularly well adapted for listening to the arterial sounds when taking the blood pressure, and is very convenient when examining patients partially dressed. It can also be used to listen to the back of a pneumonia patient when it is not desirable to turn him in bed. Being made entirely of brass, it is unbreakable. Except in very cold weather, the contact of metal with skin causes no inconvenience on the part of the patient.

The acoustic properties of this bell are the same as those of the standard Hollis bell. The instrument has practically all the advantages of the Bowles patent stethoscope without the annoyances of false râles, cracklings, and changes in the character of the sounds. Like the Hollis bell, it is inferior to the Bowles instrument in the detection of very faint, soft diastolic murmurs, but the Bowles stethoscope itself is not nearly so good as the naked ear in the detection of this important murmur. Men who use the Bowles or any other stethoscope alone and never use the naked ear will miss many important physical signs.[1]

ENTRY OF VACCINATION AND TYPHOID PROPHYLAXIS ON COVER OF HEALTH RECORD.

By R. B. HENRY, Passed Assistant Surgeon, United States Navy.

Much time is lost in checking up vaccination and the administration of typhoid prophylaxis by the necessity in each case of finding the particular entry, which is usually buried away in an obscure place among the back pages of the health record. This involves much useless labor and delay every time a draft comes aboard or when men are received from another ship or station, and even though the records are carefully checked up they may accidentally become mixed with others and then all will have to be gone over again, a useless duplication of work. To avoid this waste of time it is recommended that each health record bear conspicuously in a selected place on the outside of the front cover the words "Typhoid prophylaxis completed, ------," date being given, to be stamped thereon immediately after completion of the last injection. The entries could then

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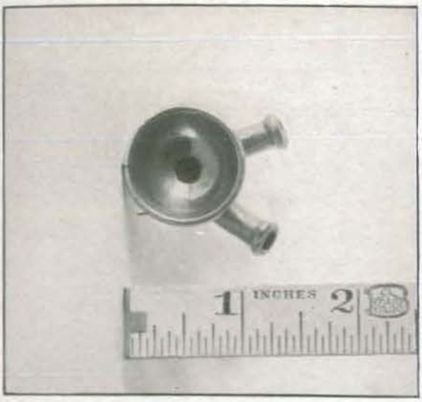
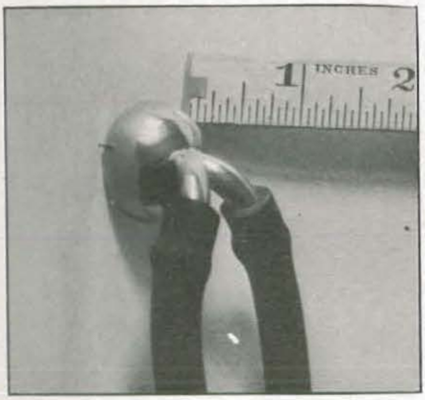
[1] During the last nine years this bell has been made by the W. F. Ford Co., 118 East Fifty-ninth Street, New York City. There is no reason why it could not be made by any good mechanic.





SMALL STETHOSCOPE BELL.

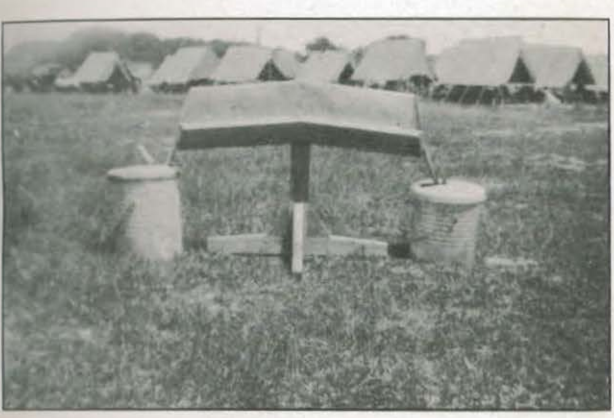
be readily seen as the records are quickly gone over like a pack of cards.

The question of similarly recording vaccination against smallpox is slightly more complicated. A simple stamping of "Vaccinated" would not be sufficient, as the vaccination might not "take" and the entry would not show protection. If a stamp were used having the word "Vaccinated, ------," leaving space for dates of any vaccinations, and immediately below it the words "Number of pitted scars, ------," the blanks being properly filled in, the entire matter would be clearly shown. An important point in connection with the use of this suggested plan of entries is that if a health record not having these entries on the cover is handled for any reason at all the omission immediately suggests an investigation to ascertain the cause, while under the present system of recording on an inside page only, the health record of an unvaccinated man, or one who had not received typhoid prophylaxis, might pass through innumerable hands without any attention being called to the missing entries, and the man might altogether escape vaccination or the typhoid injections.

Any entry which should appear on every health record should be placed on a part of the record where its absence would be immediately noted at any time the record is handled, and the place that best fulfills this requirement is the outside of the front cover.

PORTABLE URINAL FOR CAMPS.

Devised by W. L. Mann, Passed Assistant Surgeon, United States Navy.



The portable day and night urinal is intended to be set up at night in the company street. After reveille it is cleaned, sunned, and removed to a fly-proof urinal tent for day use. Weight, 25 pounds. Three urinals are allowed to a company. Each accommodates several men at a time. The contents of the buckets are volatilized in the camp incinerator. This device is in use at Quantico, Va.

CLINICAL NOTES.

CHRONIC PANCREATITIS: CHOLECYSTOSTOMY AND RECOVERY.

By F. W. HARTMAN and B. H. HAGER, Assistant Surgeons, United States Navy.

L. K. H., private, U. S. M. C., entered the service on September 13, 1915. Health has always been good and his family history is unimportant. He had a primary venereal sore in December, 1915, but has never had any secondary manifestations of syphilis.

While on duty in Haiti, June, 1916, the patient had a severe illness of two weeks duration. During the first week there was marked jaundice, nausea, vomiting, loss of appetite, and an irregular temperature. Each day there were two or three attacks of stabbing pain in the upper right quadrant, lasting from 15 to 30 minutes. None of these attacks were experienced in the second week, and the jaundice rapidly cleared up with a partial recovery.

A diarrhea developing in the above described attack continued with acute symptoms in October, 1916, and again in December, 1916. The stools were always semifluid and foul smelling, but during the acute attacks 8 or 10 per day were passed which contained blood and mucus. Repeated examinations of the stools showed no ova or parasites. Therapeutic tests of quinin and emetin hydrochlorid were given without appreciable benefit, hence the patient was transferred to this, the United States Naval Hospital, Washington, D. C., March 28, 1917, with a diagnosis of chronic enteritis.

Improvement upon a milk diet was such that a discharge was given after 30 days. On July 2, 1917, the patient again entered this hospital, all his symptoms having returned in more severe form.

Physical examinations.—Showed a man with marked emaciation and shallow muddy complexion. There was no jaundice.

Chest.—Heart and lungs negative.

Abdomen.—No rigidity of abdominal wall. No masses felt. Liver edge even with costal margin on right side. Spleen not palpable.

Blood pressure.—Systolic, 116; diastolic, 65.

Blood.—White blood cells, 6,000; red blood cells, 2,152,000; hemoglobin, 65 per cent; Wassermann, negative.

Urine.—Negative.

Feces.—Foul smelling, semifluid, and grayish yellow in color. Microscopical examination showed undigested meat fibers and numerous fatty acid crystals.

Pancreatic disease being suggested, some of the duodenal contents was drawn off for analysis. This was thick, tenacious, and light green in color. Standard tests demonstrated almost complete absence of the normal pancreatic ferments.

The frequent association of chronic pancreatitis with gall-bladder disease being generally recognized, and the early history of this case being suggestive of gall-bladder involvement, cholecystostomy was decided upon and performed by Surgeon H. F. Strine, United States Navy, July 14, 1917. The gall bladder was found to be contracted, its walls were thick and fibrous, and it contained dark brown tarry bile. No gallstones were present. The pancreas was shaped like a tadpole, the head being markedly enlarged and indurated.

The post-operative course has been uneventful. The draining bile is now of normal color and consistency. The patient has gained about 40 pounds in weight, and now, three months after the operation, is apparently well in every respect.

Of the accepted etiological factors concerned in the production of chronic interlobular pancreatitis, the most plausible in this case would seem to be an ascending infection involving both the pancreas and gall bladder, inasmuch as there were no calculi found at operation.

A NEW METHOD OF TREATING TROPICAL ULCERS.

By J. A. Halpin, Assistant Surgeon, United States Navy.

In past years much has been written on the subject of tropical ulcers, embracing in detail the causative factors, both predisposing and exciting, the theories as to why they are prevalent in tropical climates, and why their response to ordinary treatment is far from encouraging. These various factors have been taken up in detail in the works of Castellani, Chalmers, Manson, and Stitt.

The object of this paper is not to outline any new conditions found, with the possible exception of the often stated syphilitic origin, but rather to report the cases, the methods used, and the conditions found in a series of patients under observation.

In the native clinic at Canacao Hospital the number of patients who come for medical and surgical treatment has averaged above 1,000, of which a large percentage have the so-called tropical ulcers. For the preparation of this paper 35 cases were selected for experimental purposes, picked at random as they appeared at the clinic. Their ages varied from 1 year to 74 years. The cases selected were those whose condition had existed for six months or longer, and whose ulceration was 2 inches or more in diameter. The following things were noted on examination:

1. In over 85 per cent the ulceration was on the left leg.
2. The situation of the ulcer was at or near the inner malleolus in 60 per cent.
3. In the majority the ulcer was painless.
4. When discharge was present it was usually thick, tenacious, and very offensive.
5. An inflammatory zone was present in only 1 per cent of cases.
6. The edges of the ulcers were thick and usually rolled inward with a tonguelike projection in the center.
7. The body temperature was normal or only slightly elevated, never above 100 F.
8. A positive Wassermann was present in only one case. It is very rare to obtain a positive Wassermann. Of special interest is the fact that in over 80 per cent the ulcer was on the left leg. The probable explanation of this condition is that these people, when standing or squatting, bear most of their weight on the left leg, thereby causing a venous stasis, interfering with the return blood supply. In every case a Wassermann test was done, the Noguchi, checked up with the Emery method. This was done in order to ascertain the origin, and also to see if the majority were syphilitic, as has been claimed by previous observers. Strange as it may seem only one case gave a triple or strong positive reaction. The rest were all negative. The same results have been found in other cases tested which have not been noted in this paper.

Tropical ulcers, as is known, have been treated by various remedies, and this has also been done at this clinic. The favorite form of treatment when I took over the clinic was cauterization with phenol and alcohol, then putting on a dressing of iodin, balsam of Peru, or ichthyol.

If there was much foul-smelling discharge iodoform was used as a deodorant. The ulcers, however, failed to respond, and if any improvement was noted it was very slight. In the majority of cases the ulceration tended to spread rather than heal.

In order to ascertain the best method of treatment three methods were instituted, as follows:

Eleven cases, including the positive Wassermann case, were treated by first thoroughly curetting the ulcer and applying mercurial salve, 10 per cent. They were also given mercury salicylate, grain 1, twice a week intramuscularly. This form of treatment was kept up for two months.

The next method of treatment was the vaccine method. Eleven cases were selected and a culture made from the discharge by placing a piece of sterile gauze over the ulcer so as to absorb it. This was washed with sterile salt solution and filtered. The filtrate was then collected and put up in vaccine form. An autogenous vaccine was also made. The germs most frequently found were the staphylococcus aureus and albus. The cases were injected every five days with graded doses. The ulcers were curetted and covered with sterile gauze. This method was kept up for two months.

The third method of treatment was as follows: Thirteen cases were selected and the ulcers thoroughly curetted and wiped off with sterile 0.6 per cent NaCl solution. Then a 20 c. c. syringe was filled with the same solution and the contents injected beneath the ulcer, the needle entering just at the margin of the ulceration and going deep enough to prevent the solution from oozing through, which very easily happens, due to the porous condition of the floor of the ulcer. After injection the ulcer bulges and remains so distended for about one hour. It was then covered with sterile gauze saturated with the same solution. These injections were given daily as long as the ulcer persisted.

Results.—The first series of cases, namely, those which were treated with mercury injections and mercury salve, did not respond to treatment, and at the expiration of two months were the same, or, as in five cases, increased in size. The discharge was also increased. In the second series, those which were treated with autogenous vaccine and filtrate, the discharge was decreased. None of the ulcers, however, healed, and only slight improvement was noted. In the third series, those which were treated with the saline-injection method, every case responded to this form of treatment and healing took place as follows:

No.	Name.	Age.	Duration.	Size.	Treatment started.	Cured.
		Yrs.		*Inches.*		
1	P. M.	70	7 months	3	July 3, 1917	July 27, 1917
2	S. P.	25	6 months	4	do	July 31, 1917
3	F. F.	15	8 months	3	do	July 25, 1917
4	T. P.	17	1 year	4	do	July 16, 1917
5	L. B.	12	8 months	3½	July 12, 1917	July 31, 1917
6	A. C.	29	6 months	4	do	July 19, 1917
7	S. D. S.	14	do	2	July 14, 1917	Aug. 8, 1917
8	Q. M.	12	do	3	do	Aug. 20, 1917
9	C. P.	50	do	2½	July 15, 1917	Aug. 14, 1917
10	H. M.	6	7 months	2	do	Aug. 11, 1917
11	A. C.	9	15 months	2	July 16, 1917	Aug. 6, 1917
12	L. S.	1	6 months	2	July 20, 1917	Aug. 12, 1917
13	A. A.	14	do	2½	July 21, 1917	Aug. 15, 1917

In the majority of cases the cure was very rapid and permanent, the old edematous tissue surrounding the edges of the ulcers disappeared rapidly and was replaced by healthy tissue, the discharges ceased, new healthy granulation tissue soon covered the ulcer and healing resulted.

In order to check up the cases and to see with certainty that the cure resulted from the saline injections alone I proceeded as follows: The cases that had received the mercury injections were not given any form of treatment for one month, so as to allow time for any beneficial results that had been derived from the mercury to wear off. At the expiration of the month the ulcers were examined. They presented the same appearance as when last seen, with the possible exception that the discharge had lessened, which I think can be attributed to the fact that they had been kept clean, and not to any beneficial process exerted by the mercury treatment. The ulcers were then treated by the same method as the third series; that is, daily injections of 0.6 per cent saline and covering with sterile gauze saturated with the same solution. After this form of treatment was started the ulcers began to heal rapidly, and all had cleared up so that they were discharged as cured in from two to three weeks. The same method was applied to the cases treated by the vaccine method, one month being allowed to expire before starting saline injection treatment in order to see if any benefit was derived from the vaccines. The ulcers were at the expiration of this time examined and their condition noted. Very little improvement had taken place. These were then treated with daily injections of saline in exactly the same manner as has been outlined for the preceding cases. All of these cases were permanently healed in from two to five weeks.

Another very interesting case, and one that showed the good results obtained by this form of treatment better than any other thus far outlined, was an American sailor admitted to the hospital from China, who had had an ulcer on his left forearm for two years, beginning June, 1915. According to his health record and his own statement, every form of treatment had been applied without any apparent beneficial results.

The ulcer was about 1½ inches in diameter and approximately one-half inch in depth. The edges were thick and undermined so that it presented a specific appearance. Wassermann test, however, on three occasions was negative. The saline injection treatment was started on June 10, 1917. The ulcer healed and the man was discharged to duty, well, on June 19, 1917, just nine days later.

The beneficial results, and the quickness by which the ulcers responded to this form of treatment may be summed up as follows:

1. The injection of saline under the ulcers washes them from within outward, thereby tending to remove infection.
2. It produces and increases amount of lymph to the part, thereby furnishing an increased number of leucocytes.
3. The change of osmotic tension stimulates the sluggish tissues.
4. It produces a local leucocytosis, which combats infection.

5. It abstracts fluid from the surrounding tisues, increasing the blood supply to the affected area.

In conclusion I may add that this has been adopted now as the routine form of treatment of tropical ulcers at this place. The benefit derived has corresponded with the results obtained in cases used in this experiment.

I wish to thank Chief Pharmacist's Mate Lindsley, United States Navy, who helped me in performing the Wassermann tests and making up the vaccines, and by many valuable suggestions during the course of the experiment.

SUBDURAL HEMORRHAGE IN CEREBRO-SPINAL FEVER.

By U. R. Webb, Surgeon, United States Navy.

From July 1, 1916, to September 27, 1917, there have been treated in this hospital 16 cases of cerobro-spinal fever. In this series of cases there were four deaths, and in three of the fatal cases the autopsy findings have seemed to us to be of sufficient interest to warrant report. In each of two cases there was found a large, thin subdural hemorrhage over one hemisphere; in the other there were numerous punctate hemorrhages over the whole brain surface.

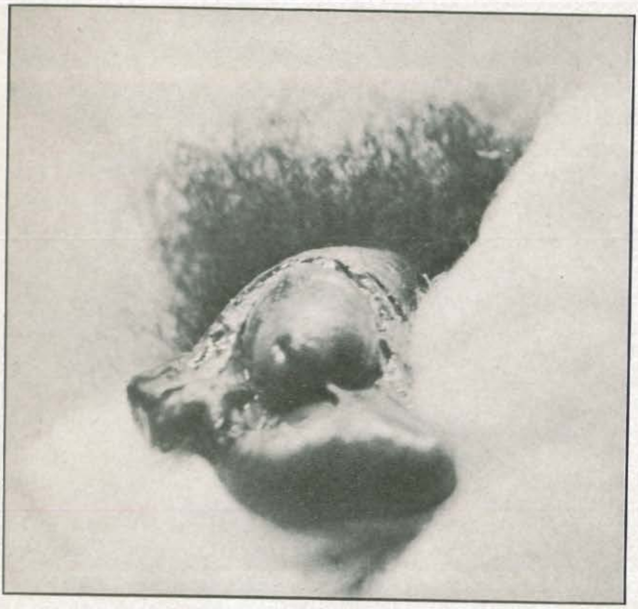
Gram negative intracellular diplococci were demonstrated in each case in smears made from the spinal fluid. There was no history or evidence of external injury in any case.

Following are extracts from the case histories and autopsy reports:

J. W. D. A-S.—Admitted at 2.30 p. m., February 16, 1917, with well-marked symptoms and physical signs of meningitis. His condition was good and seemed in no way desperate. His health record stated that spinal puncture had been made and that an undetermined amount of antimeningitis serum had been injected. Spinal puncture was made soon after admission to hospital and 20 c. c. of cloudy fluid were withdrawn and 15 c. c. of serum injected. Reaction was satisfactory and his condition was considered excellent until 8.55 p. m., when he suddenly died from respiratory failure.

Autopsy findings.—Brain edematous, marked engorgement, a large subdural clot over left parietal region, otherwise negative.

W. C. H. A-S.—Admitted on the afternoon of May 20, 1917, with well-marked symptoms and physical signs of meningitis. Spinal puncture was made, fluid withdrawn was cloudy and was positive for gram negative intracellular diplococci. Twenty c. c. of antimeningitis serum were injected. The patient rested well and seemed to improve during the night, but died suddenly at 5 a. m., about 12 hours after his admission.



CHANCROID TREATED BY DAKIN'S SOLUTION.

Autopsy findings.—Dura injected, edematous and dull in color, numerous punctate hemorrhages over whole brain surface, convolutions flattened and edematous, other organs normal.

E. T. A-S.—Admitted with measles on June 1, 1917, his convalescence from this disease was slow, and he was still under treatment in hospital when on July 10 he developed a temperature ranging as high as 104°, photophobia stiffness and soreness in muscles of neck and back with marked Kernig's. Spinal puncture revealed turbid fluid containing many meningococci. Forty c. c. spinal fluid removed and 30 c. c. antimeningitis serum (New York State Board of Health) injected by gravity method. Patient reacted well to treatment until 18 hours after, when his pulse was noticed to become weak and irregular. This condition did not respond to stimulants, and he died 21 hours after receiving serum. Autopsy revealed a large subdural clot over left parietal region, entire surface of brain intensely congested; sinuses contained a small amount of cloudy fluid. All other organs were normal, except for hypostatic congestion of lungs.

DAKIN'S FLUID IN THE TREATMENT OF CHANCROID.

By W. A. Bloedorn, Passed Assistant Surgeon, United States Navy.

The value of Dakin's fluid in the treatment of lacerated and infected wounds has been established beyond question, and its use in the present war has undoubtedly resulted in much saving of life and limb.

While it appears to have its widest range of usefulness in the treatment of infected wounds of the present war, it has also gained an important place in the equipment of the civil practioner and will remain after the war as one of the most effective means of combating the infection resulting from wounds of civil life. No doubt its range of usefulness will increase, and as a possibility in this direction a report of its use in the treatment of chancroidal infection may be of interest.

In chancroidal infection we have an acute ulcerative process appearing a few days following exposure. The lesions are usually multiple, are autoinoculable, show a remarkable ability to destroy tissue, and are often followed by an inguinal adenitis. The inguinal glands frequently break down and suppurate, causing much inconvenience and loss of time to the patient. The chancroid appears as an irregular ulcer, with a sloughing, purulent base, tender to the touch and with much purulent secretion. The character of this lesion would suggest the use of Dakin's fluid.

It was first tried in a case of multiple chancroidal infection of inner surface of prepuce. This case reported with a beginning phimosis, which quickly became complete with much edema of prepuce and elevation of temperature to 103.8 F. The lesions were exposed by a dorsal slit of prepuce. The entire field was copiously irrigated with Dakin's fluid and a large gauze dressing applied, moistened with Dakin's fluid. The solution was poured over the dressing every hour and the entire dressing changed daily. At the end of the second day the temperature was normal, the ulcers had ceased to spread, and the necrotic and devitalized borders had become detached, leaving a healthy granulating surface. The lesions continued to heal rapidly. No inguinal adenitis developed.

Following this result Dakin's fluid was used as a routine treatment for all cases of chancroid occurring aboard ship. All cases were copionsly irrigated daily, followed by a moist dressing of Dakin's fluid, and the dressing kept moist by frequent additions of the solution. The solution when kept constantly applied in this manner produced no irritation of the skin and caused the patient no inconvenience. It appears that this treatment promotes rapid healing of the ulcers, prevents further destruction of tissue, and lessens materially the tendency toward the development of buboes. The benefits of this treatment may be summed up as follows:

1. Rapid separation of necrotic and devitalized material in the ulcer.
2. The production of a clean, granulating base, which heals quickly.
3. A lessened tendency to inguinal adenitis.

TETANUS IN HAITI.[1]

By G. L. WICKES, Surgeon, United States Navy.

Five consecutive cases of tetanus have been treated by medical officers of the Navy in the Civil Hospital of Port au Prince, Haiti, with a record of 100 per cent recoveries. The last case reported was in an infant 1 month old. The child was born at home, being delivered by a native midwife. The tetanus was the result of infection of the navel cord. The procedure in each case consisted in the use of antitetanus serum, followed by Bacelli's treatment.

There is a general reduction in the number of cases of malaria in the city, though it remains constantly present. At the Maison Centrale, an industrial school for boys, the splenic index for malaria is 70 per cent.

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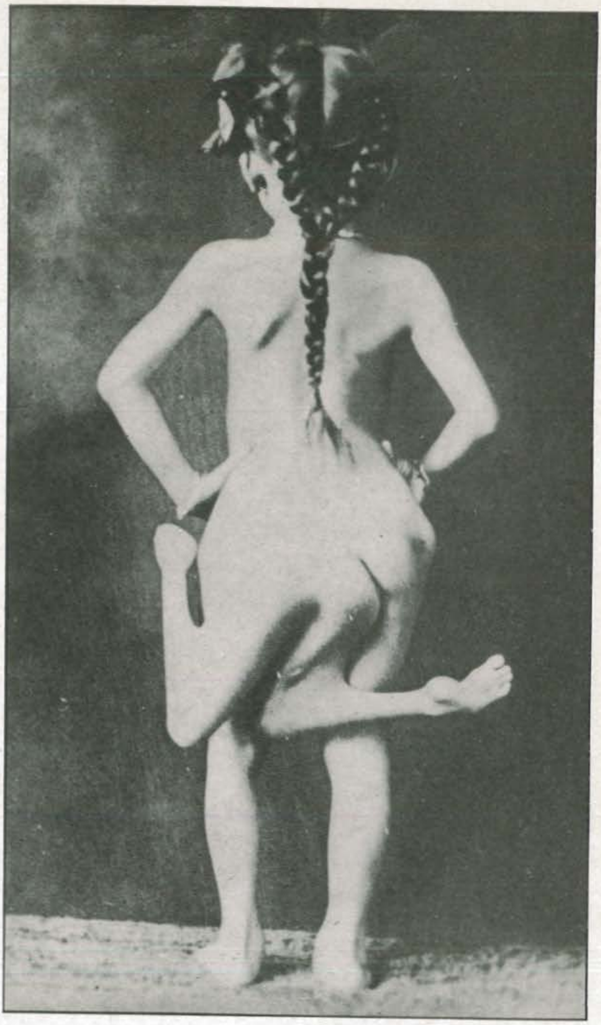
[1] Extract from weekly sanitary report, Field Hospital, First Provisional Brigade, U. S. M. C., Port au Prince, Haiti, Sept. 16, 1917.

SUPERNUMERARY LIMBS.

Reported by G. W. Baird, Rear Admiral, United States Navy, (Retired).



Filipino girl, aged 14, in good physical health and mentally bright. At birth the two supernumerary limbs were equal in development and function to the others. Now, from disuse, there is atrophy, but a certain amount of muscular control remains, the subject of the deformity being able to move the legs and to flex and extend the toes. The girl was on exhibition at Atlantic City, N. J., in August, 1917.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Medical Director E. R. STITT, United States Navy.
Medical Inspector C. N. FISKE, United States Navy.
Surgeon C. FOX, United States Public Health Service.
Surgeon F. M. BOGAN, United States Navy.
Surgeon H. F. STRINE, United States Navy.
Passed Assistant Surgeon G. B. TRIBLE, United States Navy.
Passed Assistant Surgeon R. W. McDOWELL, United States Navy.
Passed Assistant Surgeon G. F. CLARK, United States Navy.
Passed Assistant Surgeon J. C. PARHAM, United States Navy.
Assistant Surgeon J. E. HOUGHTON, United States Navy.

GENERAL MEDICINE.

DUDGEON, L. S., and CLARKE, C. **A contribution to the microscopical histology of malaria.** Lancet, London, August 4, 1917.

The authors note that these investigations were undertaken to ascertain the cause of death in some of the rapidly fatal cases of malaria occurring in the Saloniki forces in 1916. Particular interest arose from the frequency of cardiovascular phenomena in these cases.

In this epidemic of malaria sudden death was common, and a large proportion of the fatal cases died within 24 hours.

Heart.—In the microscopical examinations of sections of heart muscle fatty degeneration, of a type similar to that found in acute diphtheria, was encountered in six cases, the muscle cells showing fat chiefly in fine droplets, but also showing quite large droplets. In addition to the fatty degeneration, blocking of the capillaries with infected red cells was frequently noted.

From these findings the authors insist that the same care to protect the heart from undue exertion should be exercised in malaria as in diphtheria.

Adrenals.—Numerous changes were noted in the adrenals, but the most constant were loss of the characteristic lipoid substances of the cortex. The chromaffin substance in the medulla was also markedly reduced from the normal. Congestion of blood vessels was well marked, and where thrombosis of blood vessels occurred there was necrosis of both cortical and medullary portions of these glands. Hemorrhages were also present in the glands, showing marked congestion. These changes in the adrenals may explain the frequently noted low-blood pressure of asthenic cases of malaria.

Central nervous system.—In sections of the central nervous system the vessels are engorged with blood and a large proportion of the red cells in the capillaries and arterioles show parasites in the form of rings or dots. The black pigment of malaria is seen and not the brownish yellow pigment of hemolysis. There is a complete absence of perivascular inflammation. The nerve cells show all stages of degeneration.

In this connection it is noted that the spinal fluid of 33 cases showed normal findings in 10 cases, while in 23 there was marked increase in the lymphocytes and an increase in protein content.

Spleen.—There was congestion in all cases, free hemorrhage in some, and in several instances necrosis of the splenic pulp was observed. They noted the striking necrosis of the malpighian bodies in a case of blackwater fever. In all the spleens the areas of necrosis showed black pigment. Pigment is present in abundance in most cases, and is found free in the mononuclear cells and the small giant cells of the sinuses. None of the cases showed any evidence of amyloid change.

Liver.—Pigment deposits were noted in every case. Necrosis of liver tissue in isolated areas is of common occurrence, similar to the focal necroses of other infections.

Kidneys.—Fatty degeneration of the renal epithelium, especially of that of the convoluted tubules, was noted in several cases. Thrombosed vessels associated with foci of necrosis were also noted in some cases. (E. R. S.).

EWART, W. **Diseases of the thorax and its viscera.** Progr. Med. September, 1917.

In a symposium on tuberculosis, edited by Dr. Ewart, a number of remarkable statements are made and at least one former "fact" is proven to be false.

Our efforts at prevention and cure have so far failed. It is emphasized that while practically all children are sooner or later infected, most of them are protected by a normal immunizing process, and only a few develop the disease.

Crofton believes that the only prevention for tuberculosis is preventive inoculation. Attention is called to the danger of dissemination by song birds. Tubercle bacilli in milk, if kept in a dark place, have retained their pathogenicity for 500 days.

Many writers speak of the failure of sanitaria to produce results commensurate with the money which has been and is being spent on them. The sanitarium treatment is unfavorably commented on in editorials in the Lancet and the British Medical Journal, and the statement is made that the same amount expended for home treatment and rehousing would produce infinitely better results.

Newton believes that everyone should be tested with tuberculin in early life, just as cattle are. Those who react should receive injections twice weekly, beginning with infinitesimal doses, to establish an immunity as soon as possible.

The use of X-rays for diagnosis is emphasized, and the statement made that no case can be considered as having had a thorough examination until X-ray pictures have been taken and interpreted by one competent to do so.

Stapley says that fresh air does not cure tuberculosis and also that tuberculosis among cattle that have never been inside four walls is not uncommon in New Zealand. Besides if fresh air and sunshine cure tuberculosis it is a remarkable fact that tuberculosis has exterminated the aboriginal Tasmanian.

The reviewer is somewhat familiar with the conditions under which the natives of Tasmania, Australia, and New Zealand have lived since coming under the British rule. Instead of being outdoors they now live in houses which have little or no ventilation. As they receive pensions from the Government they are not forced to work and thus do not necessarily get exercise, fresh air, or sunshine. Many of them instead of using their pensions to purchase food spend it for intoxicants. These are the same sorts of conditions that are responsible for the frightful mortality from tuberculosis among the American Indians.

(F. M. B.)

SURGERY.

WALLACE, C. **A study of 1,200 cases of gunshot wounds of the abdomen.** Brit. Jour. Surg., April, 1917.

In discussing gunshot wounds of the urinary bladder the author states that this organ was perforated 45 times in 965 operated cases. In 25 instances it was the only organ injured. The small intestine is the organ most frequently wounded in association. It is rather remarkable how seldom the pelvic colon or rectum is perforated at the same time. The pelvis is fractured in a large proportion of the cases.

These wounds of the bladder may be intraperitoneal, or extraperitoneal, or both. The intraperitoneal lesions—perforations, tears, or slits—are very often not extensive and are as a rule easily sutured, except those which occur at the very bottom of Douglas's pouch. The bladder should be explored for a foreign body. Suprapubic drainage is not necessary here—catheterization for a few days may be necessary, or a catheter may be tied in, though this treatment is not to be continued for long. The extraperitoneal wounds, often accompanied by much hematoma, are slits or tears. They are situated on the sides of the bladder and are often caused by bony spicules. These wounds are treated by an incision down to the wound in the bladder, which latter may be sutured, if possible, and a drain left in the space formed by the operation. If the wound in the bladder can not be sutured it is most probable that a drain down to the wound will be sufficient; if there is any doubt a suprapubic cystotomy is most probably the safest course.

The uncomplicated bladder wounds show a mortality of 56 per cent. Shock and hemorrhage form the causes of death in the majority. Fracture of the pelvis seems greatly to increase the shock, and wounds of the pelvic vein seem responsible for a great deal of the hemorrhage.

In the case of complicated injuries the picture is dismal in the extreme. Most of these cases are intraperitoneal wounds, which in civil practice and when uncomplicated are not greatly feared. It would appear that the increase in time necessary to repair the bladder, after other serious injuries have been dealt with, is able to turn the balance against the patient, for the mortality is much worse than in intestinal injuries alone. (H. F. S.)

KAZANJIAN, V. H., and BURROWS, H. **Gunshot wounds of face and jaws.** Brit. Jour. Surg., July, 1917.

In discussing the anæsthesia for surgical intervention in these cases the authors say:

General anæsthesia.—The main precautions to be observed are two: (1) The avoidance of inhalation of septic material from the mouth into the respiratory passages, and (2) the provision of a perfectly free airway for the patient, so that there will be no violent efforts to breathe and no unnecessary engorgement of the veins of the neck to increase the length and difficulty of the operation.

To obtain the former end, the patient's mouth should be thoroughly cleaned and irrigated with antiseptic solution immediately prior to the administration. One hour before the operation a hundredth of a grain of atropine is given hypodermically to lessen the flow of saliva.

Anæsthesia is induced in the ordinary way until the patient is unconscious. The administration is then continued through two rubber tubes passed through the nostrils into the pharynx. The mouth is now thoroughly packed with gauze. By this means a free airway is insured, while the inhalation of blood and other material from the mouth is prevented. Sometimes it may happen that the nostrils are too small to admit tubes of a sufficiently large size. One may then use an artificial airway inserted into the pharynx through the mouth, which is then packed off with guaze around it.

During the preliminary stages of anæsthesia the patient—supposing him to have a double fracture—may be unable to breathe freely unless the head and shoulders are supported. This difficulty will not grow less as the depth of the anæsthesia increases, and unless the cause and its remedy are known very serious trouble may arise from impeded respiration. The cause is the displacement of the tongue and the anterior portion of the jaw, and the point to be realized is that the tongue must be pulled forward and the jaw also. If the jaw only, or the tongue only, be pulled forward, there may be no relief; the traction must be on both. Failing immediate relief from this measure, the patient's head and shoulders must be well raised, when he will usually recommence to breathe. If not, tracheotomy should be performed without delay.

Hill, R. Posture in cases of abdominal drainage. Ann. Surg., October, 1917.

The author invites attention to the importance of posture for drainage after operations for septic abdominal conditions and to the excellent results obtained from the prone and lateral positions in 57 cases. The three definitely recognized positions in use are, first, the Fowler position; second, the prone or ventral decubitus; third, the lateral, in which the patient is placed on his side.

The Fowler method allows fluids to gravitate into the pelvis, from which they escape by means of a drain in the cul-de-sac of Douglas. The objections to this method are that the patient must be raised to such an angle to permit free drainage into the pelvis that a strain is thrown on the heart, gastric distention is increased, and the escape of pus takes place by siphonage. In 47 cases thus treated there were five deaths.

In the prone position maximum effects of gravity, intra-abdominal pressure, and capillary attraction are secured. The patient lies on his abdomen with a pillow under his head and another beneath his chest. The head of the bed is elevated 10 to 12 inches. The pus is brought against an area of the abdomen where blood vessels and lymphatics are not so numerous, absorption is very slow, and there are no spaces in the anterior part of the abdomen to favor the formation of pus pockets. In a series of 42 cases treated in this posture for drainage there were but two deaths.

In the lateral position the patient is placed on his right side, with a pillow under the region of the liver and the head of the bed slightly elevated. He is turned so that the pus will drain from in front of the left kidney. In 15 cases treated in this manner there were no deaths.

The material found to be most satisfactory for drainage is a large slit rubber tube, with a small wick in it, with one or two additional drains of rubber dam wrapped around wicks of gauze after the plan of Morris. In summing up his paper Hill says that next to posture the most important factor in abdominal drainage is the aftertreatment, in which peristalsis is controlled by opiates, and absolutely no food is given by the mouth. A 3 per cent solution of glucose with 2 per cent sodium citrate is given by the Murphy method. This keeps up the strength of the patient and combats the tendency to acidosis. He advocates the strict application of the Ochsner treatment, in order "to secure the best results in these very interesting and but too often desperate cases." (R. W. McD.)

WILDEY, A. G. **Ununited fractures treated by Long—Axial drilling of the fractured bone ends.** Brit. Jour. Surg., January, 1915.

The author in doing a second operation for nonunion in bone found that the periosteum had not produced any callus. He was already convinced that periosteum was of very secondary importance in osteogenesis. He reasoned that if the periosteum does not produce callus, then the new bone can only come from living old bone. He further reasoned that since osteoblasts can not travel unless a free channel is provided for them, that such a channel is demanded in cases of nonunion with hardened or eburnated fragment ends.

The operation consists in exposing and cleansing the ends of the fragments, refreshing them by removing the thinnest possible transverse section of bone that will insure a complete removal of all dense fibrous tissue, and drilling in the long axis of the shaft several channels in the indurated bone ends. The effect of this maneuver is a production of an artificial porosity of the osseous tissue.

The drill is made to penetrate to healthy bone. At the same time the medullary cavity, which may be found occluded, is made patent by longitudinal perforations. Apposition and immobility of the fragments are secured by plates or other mechanical means other than by the use of wire, to which the author is opposed.

Four or five drill holes are made, using a No. 1, 2, or 3 drill. The hole is from 1 to 2 inches deep or until healthy bone is reached, which is announced by the lessened resistance to the drill and the flow of blood. The deeper the hole the greater in number and the larger in diameter they ought to be.

In every case rapid union has occurred. Perhaps the only fault has been the formation of rather an excess of callus, but this has always produced a strong leg, fit for arduous service duties.

(J. C. P.)

HYGIENE AND SANITATION.

RHO, F. **Compulsory antityphoid inoculation in the Italian Navy.** Report to Acamedy of Medicine, Rome, November, 1916.

Mortality from typhoid fever in the civilian population of Italy has been reduced 50 per cent between 1888 and 1908. There has been also during this period a marked decrease of typhoid fever in the army and navy, where the disease was, of course, less prevalent. The following table shows mortality per 1,000 of strength:

Year.	Army.	Navy.	Year.	Army.	Navy.
1891	1.41	0.38	1900	1.06	0.36
1892	1.26	.44	1901	.76	.37
1893	.86	.23	1902	.78	.27
1894	.84	.40	1903	.66	.58
1895	1.15	.40	1904	.93	.35
1896	1.10	.42	1905	.98	.41
1897	.98	.18	1906	.83	.36
1808	1.23	.48	1907	.49	.60
1899	.97	.69	1908	.62	.47

Antityphoid inoculations became compulsory in the Italian Navy in February, 1915.

Cases of typhoid fever treated in naval hospitals, February, 1915, to July, 1916, civilian as well as naval personnel.

Hospitals.	Cases of typhoid (Eberth).	Cases of para-typhoid.	Cases of para-typhoid. A.	Cases of para-typhoid. B.	Total.
Spezia	12	4	....	5	21
Napoli	11	2	2	2	17
Venezia	10	4	....	....	14
Taranto	14	....	5	7	26
Maddalena	9	....	....	....	9
Castellammare	5	1	....	....	6
Brindisi	7	10	....	....	17
Total	68	21	7	14	110

Year.	Strength.	Cases of typhoid fever.	Incidence per 1,000 of strength.
Before vaccination:			
1907	28,904	128	4.52
1908	29,415	146	4.96
1909	31.117	97	3.11
1910	31,661	118	3.72
For 12 months after compulsory vaccination:			
1915-16	70,000	64	.91

In view of the large proportion of paratyphoid infections, Castellani has employed with success a triple vaccine, a combination of Eberth, paratyphoid A, and paratyphoid B. The protection conferred is supposed to last only 28 months. The question of revaccination is an important one.

EDDY, W. H., and ROPER, J. C. **The use of pancreatic vitamin in cases of marasmus.** Am. Jour. of Dis. Child., September, 1917.

Vitamin was first isolated from rice polishings in 1911 by Funk and proved by him to be the agent which prevented beriberi as well as being an essential factor in growth stimulation. The same year Mendel and Osborne fed single purified proteins to white rats and showed that in addition to nutrients the diet of a growing rat, for proper development, required certain substances hitherto unknown, and which they found present in protein free milk and in centrifuged butter fat.

According to McCollum, a growing animal demands in his diet:

1. The presence of a "fat soluble" (his name for Mendel's butter fat factor).
2. The presence of a "water soluble" (his name for Funk's vitamin).
3. The absence of any toxic factors.

Hess has demonstrated that however much scurvy may resemble beriberi the yeast vitamin that curbs the latter does not control the former, and the orange juice that cures scurvy is not a growth stimulant and in that sense at least is not a vitamin.

All attempts to purify or to isolate vitamin in even an approximately pure form have failed. Another difficulty in the study of vitamins lies in the lack of any chemical test for their presence.

One advance in vitamin therapy has been the development of a special form of fuller's earth which when shaken with an aqueous pancreatic vitamin solution has the power to absorb the vitamin which can then be administered in concentrated form.

In addition to experimental work on rats the authors report the cases of 10 infants suffering from malnutrition who before receiving vitamin had long periods of treatment in hospitals, on various diets, and either became worse or showed no improvement. After vitamin treatment was started a marked improvement in growth and weight took place. Also its use ultimately resulted in the ability of the individual to utilize the natural vitamins present in foods.

The authors' conclusions are:

1. A diet of condensed milk and cereal is markedly deficient in natural vitamins.
2. The addition of pancreatic vitamins to such a diet influences the growth of both rats and infants.
3. The treatment produced no harmful effects.
4. The use of pancreatic vitamin seems to promise definite hope of success as an agent for stimulating the growth of marasmic children.

(F. M. B.)

TROPICAL MEDICINE.

CASTELLANI, A. **Notes on tropical diseases met with in the Adriatic-Balkans zone.** Jour. Trop. Med., July 16, August 1, August 15, September 1, and September 15, 1917.

The author notes that his statements represent his clinical experience in Servia, Macedonia, and other parts of the Balkanic zone during the past two years. The diseases are separately considered.

Malaria.—The number of cases of this disease has been appalling and pernicious types quite common. Reference is made to the current idea that malaria is not a very dangerous disease, and that its cure is a simple matter. The experience in the Balkans has shown what a terrible scourge malaria can be. The disease has shown itself largely in atypical form, simulating widely different pathological conditions. Of these are noted:

(1) Hemorrhagic types closely resembling scurvy, in which the patients were pale, showing numerous petechiæ and tense indurated swellings. Such cases at times showed spongy bleeding gums and hemorrhages from stomach and intestines. This malarial purpura rapidly responded to quinin.

(2) A pernicious anemia type with typical pallor and lemon-yellow tint, with only slight fever. The blood gives the picture of a pernicious anemia. The author notes that he has seen several cases of this type.

(3) Diseases of the nervous system. The author has encountered several cases of malarial polyneuritis. Some of these have simulated wet beriberi. One of his cases of malarial polyneuritis showed a Korsakov's psychosis. The comatose type of pernicious malaria was quite common. Some of these cases failed to show the usual high temperature and with contracted pupils may resemble opium poisoning. It is important to remember that a comatose type may develop quite suddenly in an old malarial patient in temperate zones.

The delirious type of cerebral malaria was noted in several cases and caused occasional confusion with delirium tremens. The author notes that the syndrome of cerebro-spinal meningitis may appear in these malarial affections of the central nervous system. Spinal types were rare, but one case was clinically a typical transverse myelitis.

(4) Specific infectious types. The disease which malaria most often simulates is typhoid fever, and the author notes that 90 per cent of the cases diagnosed as typhoid fever, in 1915, in Servia were malignant tertian infections. In such cases there was a slow onset, apathetic state, more or less continuous temperature, and palpable spleen. Such cases showed numerous ring form parasites and did not respond well to quinin.

Malta fever types were rare, but occasionally noted. Cases somewhat resembling Weil's disease were rarely noted as were cases of malarial jaundice resembling a simple catarrhal jaundice. Even cases suggesting tetanus, hydrophobia, and sleeping sickness may be malarial.

(5) Alimentary tract disorder types. In the dysenteric types of malaria the stool may contain blood and muco-pus or it may be almost purely hemorrhagic with only slight mucus content. Cases somewhat suggesting cholera were seen at Saloniki. One case was observed with a hemorrhagic pancreatitis syndrome.

(6) Respiratory and circulatory system types. The author has noted cases of dry bronchitis and dry pleurisy of malarial origin as well as two cases resembling lobar pneumonia. Of circulatory system types he has noted three cases resembling angina pectoris, as well as cases of cardiac arrythmia and one case of 3:1 heart block.

(7) Skin eruptions. Apart from herpes, skin eruptions were rare. He did note, however, cases of urticaria, scarlatiniform erythema, and one case each showing the picture of erythema multiforme and erythema nodosum. Pigmentations were met with rather commonly, and occasionally the syndrome of Addison's disease may be seen.

In treatment of malaria the author notes the necessity for intramuscular injections in serious cases and intravenous ones in pernicious cases.

While arsenic or other qunin substitutes have not shown value in his hands, yet an association or alternation of such drugs with quinin is often useful.

Where quinin is given for prophylactic purposes the daily dose in the Balkans should be 10 grains instead of the customary 5.

Typhus Exanthematicus.—These cases often show a marked flushing of the face, neck, and upper chest, with a subcuticular mottling of the lower chest and abdomen. This is far from specific as it is almost constant in the Pappataci fever cases. The true rash of typhus fever appears on the fourth or fifth day as spots on the abdomen similar to the spots of typhoid. These spots extend to chest, but rarely go to arms and legs. These spots may become darker and cease to fade on pressure, but seldom become as dark as the spots of a purpuric condition.

One must be on guard to prevent mistaking the insect bites, so common in the Balkans, for typhus spots in cases with fever. These flea or lice bites show a central hemorrhagic spot.

While the disease generally begins suddenly, yet, cases with a typhoidlike onset are far from rare.

In 80 per cent of cases the fever comes down rather by lysis than crisis, as is usually stated in text books.

The most frequent complications were parotitis, gangrene of the feet, polyarthritis, and neuritis.

As regards lice prophylaxis naphthalene was best suited for the clothing of troops. Although with less insecticide power than kerosene oil, iodoform, and anise preparations, it is preferable from lack of odor. For the better classes he prefers a menthol powder (menthol, gr. iii to v; zinc oxid, oz. i). This is repellant to mosquitoes as well as to fleas and lice, and tends to prevent prickly heat.

Relapsing Fever.—This was extremely common in 1915 and not rare in 1916. It was not infrequently associated with typhus and malaria.

The frequent association of typhus and relapsing fever is explainable by their transmission by the same insect, the louse. Castellani believes that the bedbug also carries relapsing fever. He notes the extreme difficulty of differentiating clinically typhus, relapsing fever, and Pappataci fever in the early period of these diseases.

While the microscope will usually clear up the diagnosis there are many cases where spirochaetes are rare. In treatment he has had excellent results with salvarsan and galyl, but thinks a combined treatment with tartar emetic more successful. He uses 4.8 c. c. of a 2 per cent solution of tartar emetic intravenously or the following: Tartar emetic, 4 grams; sol. ac. carbol 1 per cent, 100 c. c. One-half to 2 cubic centimeters of this solution is diluted to 5 c. c. with sterile saline.

Pappataci Fever.—This fever is extremely common all over the Balkans in summer. It is usually stated that *Phlebotomus papatasii* only bites in darkness, but he can confirm Hugo's statement that it will also bite during the day.

The disease, but for the rash, is entirely similar to the dengue one sees in the Orient. The face is flushed and swollen, the conjunctivae are injected, and there are rheumatoid pains, with headache and pains in the eyeballs.

The fever keeps high for about two days and then drops by crisis on the third day. It is very difficult to differentiate the early period of typhus fever from this disease, but the presence of a leucopenia in phlebotomus fever and a tendency to leucocytosis in typhus is differentiating.

Dengue.—Castellani notes that the cases seen in the Balkans are Pappataci fever and not dengue. Dengue, however, was present in Gallipoli. He makes some interesting remarks about dengue, one being that he has generally found enlargement of the superficial lymphatic glands, particularly of the cervical gland, but also of the axillary and inguinal ones. The gland juice from such glands has reproduced dengue when injected in two out of three cases.

He considers that immunity is not a feature of dengue as he has known people to have attacks in three successive years.

Typhoid and the Paratyphoid Fevers.—The author notes that typhoid is common in the Balkans, but not so common as paratyphoid A and paratyphoid B. He has seen mixed infections of these diseases and has even observed two cases of infection with all three diseases. The combined vaccines, first suggested by Castellani several years ago, have given good prophylactic results in the Army.

Camp jaundice.—Castellani divides these affections in two groups (1) a severe type or Weil's disease, which is rare, and (2) a mild type, which is common.

In the severe type the onset is abrupt with high fever and shiverings. The spleen and liver are often enlarged. Jaundice appears two or three days after the onset. Hemorrhages are common and petechiæ often present. The temperature drops by crisis or rapid lysis from the eighth to the twelfth day. There is often a short relapse. The prognosis is serious and the treatment unsatisfactory.

The mild form of camp jaundice is common. This may show a prolonged prejaundice stage in which malaise and rheumatoid pains are prominent, with but slight temperature rise. At this time the urine contains bile pigments. In the jaundice stage the patient is markedly prostrated, but has little or no pruritus. The jaundice stage may last for from two to eight weeks. Castellani believes both these types of camp jaundice to be of spirochætic origin.

Dysenteries.—Bacillary dysenteries are extremely common in the Balkans. He has seen a type which clinically resembles cholera, the stools being serous with only now and then a tinge of blood.

As to treatment he warns against giving astringents at the beginning. This should start with magnesium sulphate, 2 drams every 2 hours for from 24 to 48 hours. Then astringents may be used. He notes that polyvalent sera are on the whole efficacious.

Polyarthritis and parotitis are complications which may occur, and in the polyarthritis of bacillary dysentery salicylates are of no value.

Flagellate diarrheas.—Flagellate diarrhea is far from rare in the Balkans. The flagellates most frequently found are *Lamblia intestinalis*, *Trichomonas hominis*, *Cercomonas hominis*, and *Tetramitus mesnili*. In three cases the author has found *Provazekia asiatica* as cause.

It is probable that where flagellates are present in small numbers they give rise to no symptoms. *Lamblia* seems to have a more distinct pathogenic action than the others.

In treatment of this condition Castellani still recommends methylene blue. For the first two or three days he gives aperients (sodium sulphate) followed by 1 to 3 grains of the drug, t. i. d. The drug must be absolutely pure, free from arsenic. He often combines the drug with 5 grains of salol. Besides oral administration he recommends intestinal irrigation with 1 to 5,000 or 1 to 3,000 methylene blue.

Bronchial spirochætosis.—This condition is not rare in the Balkans. Castellani distinguishes three types—the acute, the subacute, and the chronic type.

In the acute type the patient has a temperature rarely exceeding 103 F., coughs a great deal, expectorating a scanty muco-purulent secretion, and has rheumatoid pains all over the body.

In the chronic types the temperature may be normal or somewhat hectic. There is cough and expectoration of muco-purulent material. This type may suggest tuberculosis.

The diagnosis is based on the finding of spirochætes in the sputum. Bronchomycoses are also met with in the Balkans. (E. R. S.)

PATHOLOGY, BACTERIOLOGY, AND ANIMAL PARASITOLOGY.

MORISHIMA, K., and TEAGUE, O. **The isolation of typhoid bacilli from urine.** Jour. Infect. Dis., August, 1917.

The writers found that eosin brilliant-green agar gave the most satisfactory results for plating urine.

"The medium is prepared as follows: 1 pound of chopped beef is soaked in 1,000 c. c. of distilled water in the ice box overnight. The fluid is squeezed through cheese cloth, heated, and passed through filter paper. To the filtrate are added agar (1.5 per cent), Witte's peptone (1 per cent), and chemically pure sodium chlorid (0.25 per cent). This mixture is heated in the autoclave at 15 pounds pressure for 20 minutes. The reaction is brought to 1 (hot titration) and the medium is cleared with egg white and filtered through cotton. It is then placed in flasks in amounts of 200 c. c., sterilized in the autoclave, and stored for use. To 50 c. c. of the agar are added ½ gram lactose, 1 c. c. of 3 per cent eosin solution, and 1 c. c. of 0.2 per cent brilliant-green solution. The agar is shaken and poured into Petri dishes."

Comparison was made between plating the urine directly and after enrichment by incubation overnight with broth, 3 per cent dextrose, and with salt solution. Broth was found to be most satisfactory for enrichment.

The method finally adopted was to plate directly from the urine upon eosin brilliant-green agar. Another portion of the urine was used for enrichment—1 part of broth, reaction +1, to approximately 2 parts urine. If typhoid organisms were not found by the following morning from the plates prepared directly with urine, dilutions from the incubated urine and broth were made $\frac{1}{10}$, $\frac{1}{100}$, and $\frac{1}{1,000,000}$.

A loop from dilutions of $\frac{1}{1,000,000}$, $\frac{1}{10,000}$, and $\frac{1}{100}$ was plated onto the eosin brilliant-green agar, one plate for each dilution. The loopful was spread over the entire surface of the plate, going from one area to another to insure proper distribution. (G. F. C.)

SMEETON, M. A. **Comparison between the subcutaneous and intracutaneous methods of testing the virulence of diphtheria bacilli.** Jour. Infect. Dis., September, 1917.

The usual methods of determining virulence by subcutaneous injections with the modifications by Neisser and by Zingher, who used intracutaneous injections, are discussed.

Comparison of the subcutaneous and the intracutaneous methods, using 37 organisms from throats of positive or suspected cases, was done. Twenty-two of the 37 cultures gave identical results by both methods—14 were virulent and 8 nonvirulent.

Because of an infectious disease among the animals 15 of the tests were repeated. A possibility of error by the subcutaneous method was noted in three cases, as the test animal died and the corresponding control lived, death being due to infectious disease.

The intracutaneous test used was the modification by Zingher and was performed as follows:

"Two guinea pigs are used for testing 4–6 strains. The hair on the abdominal surface is removed and four or six areas are marked according to the size of the pig. One pig serves as a control and receives about 100 units of antitoxin intracardially at the time of making the tests, or intraperitoneally 24 hours before. A bacterial suspension is made from a fresh 24-hour growth from an ordinary Loeffler's slant suspended in 20 c. c. of physiologic sodium chlorid solution; 0.15 of this emulsion is injected intracutaneously into both pigs. A very fine steel or platinum iridium needle should be used. If the injection is properly made, a circumscribed elevation appears which persists one or two minutes. Virulent strains induce a definite local inflammatory lesion which shows a superficial necrosis in 48–72 hours. In the control pig the skin remains normal. With nonvirulent strains no lesion will be found in either control or test animals.

"For the subcutaneous tests, the organisms were grown in meat infusion broth (neutral to phenolphthalein), to which 10 per cent horse serum was added. After an incubation period of 48 hours, 2 c. c. of this toxin culture were injected into a test pig. A control pig received the same amount of culture and at the same time 100 units of antitoxin.

"Variations in the susceptibility of the different animals used appeared to influence the results in a small degree. In two instances the test pigs inoculated subcutaneously did not react, while the test pigs inoculated intracutaneously showed marked necrosis. A repetition of the tests gave conclusive evidence that the organisms injected were virulent and that the failure to produce death was in all probability due to a certain amount of natural antitoxin possessed by the individual guinea pigs.

"In the other instance the first test pig injected intracutaneously was apparently insusceptible.

"From the number of cultures tested, the intracutaneous appears to give more accurate results than the subcutaneous method and has a further advantage of being more economical in time and animals. A possible disadvantage lies in the fact that if one toxin pig dies, four or six tests must be repeated." (G. F. C.)

DOCHEZ, A. R., and AVERY, O. T. **The elaboration of specific soluble substance by pneumococcus during growth.** J. Exper. M., Balt., 1917, xxvi, 4, 477–493.

The writers here show that the pneumococcus, during the early stages of its growth, forms a readily soluble substance which diffuses into the culture medium in vitro, and in human and animal infections is present in the circulating blood, whence it passes through the kidneys into the urine. Type III forms a large amount of the soluble substance, II and I less, in the order named. The soluble substance is demonstrated in bacterium-free bouillion and in the serum and urine of rabbits infected with pneumococcus.

A series of precipitin tests on urine of cases of lobar pneumonia and closely related respiratory diseases resulted in 62.5 per cent positive reactions, the substance secreted reacting with the type of serum corresponding to the organism with which the individual is infected. No positives were obtained from patients with other respiratory diseases. The amount of the precipitable substance seems to be of prognostic import, as cases failing to show the reaction generally recovered while those showing large amounts excreted gave a high mortality. The specific precipitin test would seem to be of use in the early diagnosis of type, the authors having proved this test to be quite as reliable as the agglutination of the organism isolated from the sputum. However, they do not believe this test should supplant the usual diagnostic technique in determination of pneumococcus type.

The soluble substance is identified as a protein which is not destroyed by boiling, precipitation with alcohol, acetone or ether, or by trypsin digestion. The toxicity has not been determined, no definite answer being given, but the writers suggest that "it possesses a degree of toxicity which, exhibited throughout the course of an infection, may account for the signs of intoxication on lobar pneumonia."
(J. E. H.)

AVERY O. T.; CHICKERING, H. T.; COLE, R. C.; and DOCHEZ, A. R. **Acute Lobar Pneumonia, Prevention and Serum Treatment.** Monographs of the Rockefeller Institute for Medical Research, No. 7, October 16, 1917.

The pneumococcus is typically a lance-shaped diplococcus. It is nonmotile, nonflagellated, and does not form spores. It is bile soluble, possesses a capsule, is gram positive, ferments inulin, is extremely pathogenic for mice, and on blood agar forms a small, moist, flat, ringed, checkerlike colony with a greenish zone of methemoglobin about it.

The various types react specifically with their homologous immune sera. The capsule surrounding the organisms is most pronounced in Type III or pneumococcus mucosus as it is called. Pneumococci grow equally well under aerobic and anaerobic conditions. The thermal death point is 52 C. for 10 minutes. The optimum temperature for cultivation is 37 C., the limits of temperature being 25 to 41 C. As a rule pneumococci isolated from the blood of pneumonia patients are of such virulence that .000001 c. c. of broth culture kills white mice in 36 hours. However, strains may be recovered which possess only moderate virulence.

Four principal types of the pneumococcus have been isolated, called, respectively, Type I, Type II, Type III, and Type IV. The authors' studies show that Type I and Type II are responsible for the largest number of cases of pneumonia (64%), with 57% mortality: that Type III, while only responsible for 12% of the cases studied, is associated with the greatest mortality (100%). Serum prepared from Type I is highly efficacious in the treatment of pneumonia due to Type I. That prepared from Type II is much less efficacious. In their words, "Indeed it has not yet been thoroughly demonstrated whether it has any practical effect on the outcome of the disease or not." Serum prepared from Type III has only a slight therapeutic value, while no serum of any value has been prepared from Type IV.

The etiological diagnosis is important because identification of the type is of value in prognosis and because treatment with serum is only applicable in Type I.

Media should be prepared from fresh meat, and not from beef extract. The reaction of the media should be from 0.3 to 0.5 acid to phenolphthalein. Sterilization should be accomplished by the Arnold method for 20 minutes on three successive days. Media should not be autoclaved. The media and stains required are nutrient broth and agar, blood agar, serum water media for fermentation test (this medium contains beef serum, litmus solution, and inulin), sterile bile, Gram's stain and a capsule stain. Full directions for preparing the media and stains are given in the article.

Sputum should be collected from the deeper air passages and sent to the laboratory at once. Direct smears should be made and stained by Gram, by Ziehl-Neelsen, and by Hiss capsule stain. A small portion is washed, centrifugalized, and inoculated intraperitoneally into a mouse. As soon as the mouse is killed or dies the peritoneal cavity is opened with sterile precautions and cultures are made from the exudate on one half of a blood agar plate, the other half of which is used to plate blood withdrawn from the heart of the animal. Films are also stained with the before-mentioned stains.

The exudate from the peritoneal cavity is washed out. When in pure culture the macroscopic agglutination test may be made direct from this exudate after centrifugalization (the technique for the entire procedure of identification is fully described in the article).

For the agglutination test equal quantities (0.5 cc) dilutions of the immune serum and a suspension of the organisms are used. Results are determined after incubation for one hour at 37 C. To satisfactorily differentiate the types it has been found that in Type I a dilution of 1 to 20 should be used, in Type II a dilution of 1 to 20, and in Type III a dilution of 1 to 15.

By using Type II serum in a 1 to 20 dilution and also in undiluted form, certain subgroups of Type II may be differentiated. Where no agglutination takes place and the organism is bile soluble, it is classified as Type IV.

A specific precipitin reaction is also of value. This may be obtained from the urine.

Pneumococcus may be obtained from the blood of the patient in about 20% of cases. It may be said that the greater number of colonies obtained from one c. c. of blood the more likely the disease is to have a fatal termination.

A polyvalent serum is of no value. There is also some danger of producing an anaphylactic reaction. Determination of the type can ordinarily be made in from 6 to 18 hours. It is therefore best to make bacteriological tests of cases of pneumonia, and if found to be due to Type I to administer the serum prepared from that type. Before administering serum it is well to determine whether the patient is sensitive to horse serum by intradermal inoculation of .02 c. c. of sterile diluted horse serum (normal or immune). An injection of a like amount of sterile salt solution is made as control. If the patient shows a reaction, steps must be taken to desensitize.

Serum should be administered intraveneously. The initial dose should be about 90 to 100 c. c. and given every eight hours in doses of 90 to 100 c. c. until favorable results are obtained.

The average total amount of serum required in their cases was about 250 c. c. It must be given slowly and must be warmed slightly above body temperature. It is better to dilute with equal parts of sterile freshly distilled salt solution. Not less than 30 minutes should be taken to administer the serum. If untoward symptoms arise during the injections, stop and wait 15 or 20 minutes. An anaphylactic reaction is usually quickly relieved by a hypodermic injection of 0.6 c. c. of epinephrin 1 to 1,000 solution or 0.5 mg of atropine sulphate, or both.

It has been found that those pneumococci most commonly found in the mouth secretions of normal individuals belong to the types that give rise to a minority of the cases of pneumonia. Also, the disease produced by these organisms, except Type III, is less severe in character. Types I and II cause a majority of the cases of lobar pneumonia, are of high virulence, and are seldom found in the mouth secretions of normal individuals, unless such person has been in intimate association with a case of lobar pneumonia.

(C. F.)

CHEMISTRY AND PHARMACY.

WIMMER, C. P. **The war and pharmacy.** Am. Jour. Pharm., October, 1917.

The author reviews in an interesting way the situation of pharmacists in the European countries involved in the present war. A careful review of German and Austrian publications reveals the existence of a serious lack of qualified assistants in drug stores. Almost every other advertisement for help asks for lady pharmacists. Female help is being employed in German pharmacies on an unprecedented scale. All chemicals which can be utilized by the Government have been seized. The market abounds with substitutes, many of them offered under proprietary or trade names and practically of no value. For example, a substitute salad oil proves on analysis to be a solution of gum in water, colored yellow with a coal-tar dye, and having a food value of only one two-hundred-and-fortieth of that of oil. In order to save lard or eatable fats various combinations are recommended as a base for liniments and ointments. These for the most part contain rape-seed oil, olein, ammonia water, lime water, and either lard, paraffin or liquid vaseline. It is claimed that they are readily miscible with chloroform. In place of tincture of iodin a 5 to 10 per cent solution of tannic acid in 95 per cent alcohol is recommended. Owing to the scarcity of soap the following preparation is widely used:

Quillaja bark, 100 grams, is heated with 300 mils of water in a steam bath for one-half hour. Filter and when cool add kaolin, 400 grams, and talcum, 400 grams. Flavor with 10 drops of benzaldehyd.

Another interesting preparation is vegetable milk. Experiments with the milk juices of almonds, hazelnuts, walnuts, and soya beans suggests that these milks have considerable value. Upon standing, a cream separates, which can be used in tea, coffee, or cocoa, and imparts the same taste as the cream of cow's milk.

The pharmacists of Russia are realizing their dependence upon German products, and new chemical and pharmaceutical societies are being organized with a view to stimulating manufacture of remedies formerly obtained from Germany. In Tomsk, for example, such preparations as urotropin, antifebrin, xeroform, etc., are now produced. There is a movement on foot to cultivate medicinal plants such as the castor bean.

The army council of the English Government has taken possession of all stocks on hand in a wholesale or retail business in excess of quinin sulfate, 100 ounces; quinin bisulfate, 25 ounces; quinin hydrochlorid, 25 ounces; phenacetin, 7 pounds; formaldehyd, 10 gallons.

Glycerin is no longer obtainable and substitutes are offered for it, depending upon the purpose for which it is to be used. As a softener for the skin, it is replaced by a mixture of equal parts of anhydrous eucerin and concentrated solution of calcium chlorid. In general, the substitutes for glycerin may be divided into four classes: (*a*) Solutions of salts, (*b*) solutions of sugar, (*c*) solutions of gums, (*d*) solutions of oils.

Owing to the great necessity for economy in sugar, physicians are requested not to prescribe sirups. There are more desirable flavors than sweet, though these are most pleasing to infants. There are many cases where a sour preparation would be preferred, and in these fermentation would not occur. It is proposed to use malt extract in place of sugar. One gram of malt extract generally produces about 1 gram of sugar in a porridge or rice and milk pudding.

As one reads Dr. Wimmer's article and realizes in how many other branches of work the countries of Europe are increasing the habits of thrift already developed so far beyond anything that prevails in this country, the thought presents itself that there may be incidental benefits for us and many lessons from this war which could be acquired in no other way. If, in addition to accomplishing the main objects for which we are fighting, this country can learn to husband its resources and to employ them wisely, if communities, families, and single individuals can through the force of temporary necessity acquire those habits of thrift and economy so conspicuously lacking up till now, we shall have been paid and well paid for our service.

EYE, EAR, NOSE, AND THROAT.

PATON, L. **Functional spasm of accommodation.** Brit. J. Ophth., London, vol. 1, No. 10.

True spasm of accommodation is one of the rare conditions met with in ophthalmology. The term is frequently applied, however, to the partial contraction of the ciliary muscle found in some young hypermetropes, which may compensate, partly or fully, the amount of hypermetropia. This is not true accommodative spasm, but is a physiological adaptation in the interests of clear vision. A smaller degree of spasm of the ciliary muscle exists in a definite proportion of myopes, especially among uncorrected myopic school children. It may be only a phenomenon associated with increased convergence that uncorrected myopes and astigmatics adopt to get clearer vision.

True spasm may be defined as a sudden development in one or both eyes of a high degree of apparent myopia which disappears under the influence of atropin. This spasm may be either continuous or clonic, or may pass from clonic to a continuous condition and may be associated with spasm of other ocular muscles. Several cases were reported.

(G. B. T.)

FRANK, I. **Post-tonsillectomy lung abscess.** Laryngoscope, St. Louis, Vol. XXVII, No. 6.

Bassim in France in 1913 reported 19 cases of broncho-pulmonary complications following tonsillectomy, of which two were lung abscesses. At the Massachusetts General Hospital among 16 cases of lung abscesses during a period of eight years "several followed tonsillectomies." Yankauer has mentioned four cases. Manges recently published a series of nine cases, six of which occurred during a period of six months at Mount Sinai Hospital. Records of the Michael Reese Hospital Library, covering a period of 10 years, show 37 diagnoses of lung abscesses made, of which three were made a short time after tonsil operation. The histories in all of these cases show a marked similarity. A circular letter to 50 internists, surgeons, and laryngologists gave information of 15 more cases.

The mechanism by which pulmonary abscess is produced during or following tonsillectomy is either by aspiration of blood or infected material or septic embolism. Anæsthesia, per se, can not be held responsible, for general anæsthesia used for operations remote from the nose and throat practically never produces lung complications more serious than pneumonia. Metastatic pulmonary infection can readily occur from the exposed and more or less injured blood vessels covering the outer walls of the pharynx and tonsil cavities, which are in a field which it is impossible to keep free from saliva and pus. (G. B. T.)

DOWNEY, J. W., Jr. **The value of the complete examination of the ear in syphilis.** Am. J. Syph., Vol. I, No. 3.

Many investigations give evidence that the eighth nerve is more frequently attacked in all stages of syphilis than any other cranial nerve, and that the lesion is a true neuritis. The internal ear and eighth nerve have two separate and distinct functions—hearing and equilibration. The deafness due to a syphilitic acoustic neuritis may be very slight and the patient hear the voice well; the most characteristic hearing defect is a shortening of the duration of perception for a tuning fork by bone conduction out of all proportion to the shortening of duration of perception for the same fork when it is heard by air conduction. High-pitched forks are badly heard, but those of low pitch are relatively better by air conduction. Vertigo, nausea, vomiting, and spontaneous nystagmus are the principal symptoms indicating involvement of the static labyrinth, but in syphilis the last three are not common, and even vertigo may have to be elicited on questioning, when on examination it is found that the static labyrinth is completely dead. The Bárány tests of the static labyrinth give constant results in normal individuals. They depend upon overstimulation of the terminal nerve fibers in the ampullae of the semicircular canals and in the vestibule. This stimulation is produced by a movement of the endolymph set into action by rotating the individual in a smoothly revolving chair of special design, or by irrigation of the ears with water above or below body temperature.

The objective signs produced by this stimulation is a nystagmus, depending in character upon the set of canals which are stimulated, past pointing of the extremities, and falling of the body to one side or the other. Jones and his coworkers have succeeded in locating and tracing the neuraxial tracts of the vestibular of the eighth nerve. They teach that each semicircular canal has a nystagmic tract and a vertiginous tract, and the tests are particularly valuable in the localization of the cerebellar and brain stem lesions. At least it can be determined with a degree of certainty whether an eighth nerve involvement is intralabyrinthine in the nerve trunk or central. A clinical study of patients with syphilitic deafness by the Bárány methods, in the author's experience, has indicated lesions in all portions of the aural nervous apparatus. The most characteristic reaction of syphilitic vestibular disease is a lowering and a confusion of all the responses from the static labyrinth. This may vary from the totally dead labyrinth, giving no response, to cases showing normal responses, reduced in degree. Increased irritability of the static labyrinth, evidenced by prolonged nystagmus, with nausea and vomiting, is a sign which may not be overlooked. Crossed past pointing may be present. The pathology of these auditory cases is probably, first, a toxic irritation from an infected spinal fluid, which is followed by an involvement of the nerve tissue itself. The eighth nerve is devoid of neurilemma and its location makes it liable to attack.

(G. B. T.)

SPOHN, G. W. **A working knowledge of ophthalmology and oto-laryngology for the general physician.** Jour. Indiana Med. Assn., vol. 10, No. 7.

Since the generalist is obliged to treat eye and ear cases, he should have at least a gross knowledge of these subjects. It is better to do nothing than the wrong thing. There are three symptoms in eye diseases that should be remembered—congestion, including redness and edema, pain, and lachrymation. These may be produced by a foreign body, but its elimination should make one suspicious of conjunctivitis, because 30 per cent of all eye diseases are conjuctival. Conjunctivitis is due to infection, which can be verified by laboratory methods, or mechanical irritation, which, if removed, will cure the disease. In iritis there is a free flow of tears, pain in the eye and temple, redness around the cornea, while with conjunctivitis the redness is greatest away from the cornea. In glaucoma the cornea is anæsthetic and hazy, the tension is increased, there is intense pain of neuralgic nature, and sometimes nausea. The treatment of iritis and glaucoma is extremely important, as is any disease of the deeper structures of the eye, and should be left to the ophthalmologist.

To avoid middle-ear diseases and deafness, physical defects should be corrected in childhood.

NOTE.—Discussion by Dr. E. M. Shanklin and Dr. William Posey brought out the fact that much damage is needlessly done by improper treatment in general practice when skilled advice is at hand, and cases are not treated or are improperly treated and prescribed for sometimes by optometrists, and are only referred when it is too late to save the sight or to make an early diagnosis of intracranial or other lesions giving eye symptoms.

(G. B. T.)

MILITARY, LEGAL AND INDUSTRIAL.

BALESTRA, D. **Statistics of the Italo-Austrian campaign.** Gior. di med. mil., Roma, LXV, III, March 31, 1917.

No account is taken of minor sickness or injury treated in field dressing stations or dispensaries, and figures refer to hospital cases proper.

Morbidity from commencement of military operations to December 31, 1915, 2.71 per 1,000 of strength; from January 1, 1916, to June 30, 1916, 1.57 per 1,000 of strength.

These figures are regarded as very gratifying, as calculations based on previous wars, especially those of more recent date, warranted provision for a morbidity of 4 per 1,000 in large units. While the favorable results are due in part to wise provisions in the matter of food, clothing, and trench and camp construction, the most important contributing factors lie in the general sanitary precautions taken and especially the various prophylactic measures employed.

Table showing percentage of admissions for various types of morbidity:

	First period.	Second period.
	Per 100.	*Per 100.*
Ordinary medical diseases	58.81	66.81
Ordinary surgical diseases	12.49	17.80
Epidemic or endemic diseases	7.57	3.59
Diseases of the eye	9.06	4.44
Venereal diseases	9.05	4.62
Scabies	3.02	2.74
Total	100.00	100.00

It is apparent from the above tables that all those maladies against which sanitary and prophylactic measures could be employed underwent a marked reduction in the second period, and the only increase evident was in the ordinary medical and surgical affections inseparable from the fatigue and exposure of campaigning.

War wounds and injuries.—A study of the losses sustained in the principal campaigns of previous wars, and more especially in the Russo-Japanese war, promised a basis for estimating the surgical provisions necessary for modern war, but it soon became evident that any conclusions drawn from the past must fall far short of the facts in the present war. This is due in large measure to the extensive use of high-caliber artillery and of various forms of explosive bombs, the latter favoring severe wounds and complicating sepsis. In spite of this, however, the percentage of losses has been much less than might have been imagined.

The actual losses for the average number actively participating in battle have been: First period, 7.13 per 100; second period, 5.06 per 100.

These figures are not high when one considers that the average loss for large units, such as whole armies, were estimated at 10 or 15 per cent. Fischer, whose forecasts were regarded as particularly trustworthy, estimated that the total losses in the large armies engaged would reach 22.5 per cent. The low percentage of wounded, considering the numbers engaged, is to be explained by the nature of the fighting in the present war, where combat in the open has been rare compared with trench warfare.

Table showing the percentage of wounds due to various types of weapon, hand grenades, and bombs being included with shell wounds:

	First period.	Second period.
	Per 100.	*Per 100.*
Shell wounds	46.91	54.84
Wounds from small arms	52.60	39.16
Wounds from sword, bayonets, etc	.36	.59
Effects of asphyxiating gases	.13	5.61

It is interesting to compare this with the figures for the Russo-Japanese War:

	Per cent.
Wounds from small arms	80
Wounds from artillery	15
Wounds from sword, bayonet, etc	5

Here the proportion of bullet to shell wounds is 5.33 to 1, whereas in our Army in the present war the percentages are almost the same for the first period, and for the second period shell wounds are to rifle wounds as 1.4 is to 1. There has therefore been an increase in the relative losses from artillery fire, and the very latest figures furnished by the Surgeon General of one of our Army Corps show a proportion of 3 to 1 in that body.

While there was a conspicuous increase in the losses from asphyxiating gases in the second period, due to their extensive employment by the enemy, it can be positively affirmed that owing to efficacious and important measures adopted by our forces for both collective and individual protection the losses from this cause will steadily decrease, no matter to what extent the enemy may employ it hereafter.

It is easy to understand why from the nature of the fighting the percentage of wounds from cutting and stabbing arms is low.

The following tables classify wounds by their severity and by locality:

TABLE A.

	First period.	Second period.
	Per 100.	*Per 100.*
Severely wounded	31.60	23.62
Slightly wounded	55.38	63.01
Trivial wounds permitting immediate return to formation	13.02	13.37

TABLE B.

	First period.	Second period.
	Per 100.	*Per 100.*
Wounds of head and neck	18.40	21.92
Wounds of thorax	10.95	12.83
Wounds of abdomen and pelvis	6.35	8.80
Wounds of upper limbs	34.80	27.52
Wounds of lower limbs	29.50	28.92

In A and B we see the high percentage of serious wounds and in a corresponding way the frequency of wounds of head, abdomen, pelvis, regions whose involvement is usually synonymous with grave danger.

The figures for trivial wounds are practically identical for the two periods, but those for wounds of the limbs are astonishing. Wounds of both upper and lower limbs are fewer in the second period, but in their percentage importance have changed places.

Mortality.—It is of interest to inquire into the proportion of dead to wounded, and a distinction must be made between wounds immediately fatal and those from which death follows after a distinct interval of time. Wounds that are immediately fatal have usually involved the large vessels, the intra-abdominal or intrathoracic organs, or the skull contents. Wounds which are not immediately fatal depend for their outcome on a variety of circumstances, such as primary or secondary infections, and the opportunities for treatment afforded by field hospital service. The following table shows the proportion of wounds immediately fatal to wounds where death followed at a later period:

	First period.	Second period.
	Per 100.	*Per 100.*
Deaths on the field	5.47	7.87
Deaths in field hospitals, etc., following wounds	11.24	10.16

These figures would seem to show a somewhat lower percentage for this war than for previous ones. The mortality secondary to wounds was estimated at 16 per cent of wounds in the Japanese Army during the Russo-Japanese War; the average in the War of Secession in the United States was 14 per cent; in the Boer War, 5 per cent. When we consider the organization of medical service and the improvement in surgical technique and the remarkable progress through aseptic and antiseptic methods we would expect to have a better showing than this. We have to remember, however, that on account of the preponderance of shell wounds serious complications are much increased, and the real wonder is that death following injuries of this kind is not more frequent than it is.

In discussing this question of mortality it was interesting to investigate the relative proportion of officers and men killed. In the present war we find that one officer was killed for each 29.8 of the men during the first period, and one officer for each 27 men killed during the second period. While these figures are somewhat lower than the average obtained from previous wars, namely, one officer to 25 men, we must except our own campaign in Africa, during which the losses of officers and men were in the proportion of 1 to 15. It might appear at first blush that the universal adoption by officers of campaign uniforms had something to do with their better mortality rate, but this explanation can not hold in view of the fact that it was precisely during the second period reported upon that the change in uniform had become generally enforced and adopted. There are therefore other factors to be investigated in order to clarify this point, and they probably depend on the conditions which prevail at the moment of actual battle.

Laws relating to venereal disease. Weekly Bulletin of the Department of Health, City of New York, June 2, 1917.

At the recent session of the State legislature two excellent laws were placed on the statute books, laws which should prove of immense influence in bringing about a more effective administrative control of venereal diseases.

One of these constitutes an amendment to the domestic relations law and requires all persons applying for a marriage license to take the following oath:

I have not to my knowledge been infected with any venereal disease, or if I have been so infected within five years I have had a laboratory test within that period which shows that I am now free from infection from any such disease.

It is true that conjugal venereal infection is often due to disease contracted by one of the parties subsequent to marriage, and that the provision quoted above will therefore be without influence on all such cases. Moreover, the mere taking of the oath will not make absolutely certain that both parties are free from infection at the time of marriage. Nevertheless the new law should exert an important educational influence on a hitherto much tabooed subject.

The other law relates to advertising, and adds the following section to the penal law:

SECTION 1142*a*. *Advertisements relating to certain diseases prohibited.*—Whoever publishes, delivers, or distributes or causes to be published, delivered, or distributed in any manner whatsoever an advertisement concerning a venereal disease, lost manhood, lost vitality, impotency, sexual weakness, seminal emissions, varicocele, self-abuse, or excessive sexual indulgence and calling attention to a medicine, article, or preparation that may be used therefor or to a person or persons from whom or an office or place at which information, treatment, or advice relating to such disease, infirmity, habit, or condition may be obtained is guilty of a misdemeanor, and upon conviction thereof shall be punished by imprisonment for not more than six months, or by a fine of not less than $50 nor more than $500, or by both such fine and imprisonment. This section, however, shall not apply to didactic or scientific treatises which do not advertise or call attention to any person or persons from whom or any office or place at which information, treatment, or advice may be obtained, nor shall it apply to advertisements or notices issued by an incorporated hospital or a licensed dispensary or by a municipal board or department of health or by the Department of Health of the State of New York.

ALDEN, P. **What France is doing for her disabled soldiers and sailors.** Progress (British Inst. of Social Service), Vol. XII, No. 1, January, 1917.

For the first eight months of the war the mutilated and disabled were practically objects of charity, their only succor being the "assistance publique," under the ministry of the interior. In April, 1915, the director of this service, M. Brisac, assumed chairmanship of an interministerial commission, comprising representatives of ministers of war, marine, public instruction, commerce, and agriculture, "to study the question in all its aspects, to settle the principles upon which it should be treated, and to assign parliamentary funds." The commission established the Institut de Saint-Maurice, near Paris, and the École Normale, at Bordeaux, and subsidized private institutions at once to the amount of 2,000,000 francs. The Bordeaux school specializes in cases of loss of arms. One year later the responsibility was assigned to the coordinating national office for mutilated and discharged soldiers administered by the minister of labor, undersecretary of state for war (health service), and the director of public assistance and hygiene.

The office includes an administrative committee, a commission of reeducation, and a council for the study of improvements, and its work includes the following:

1. To keep a register of every soldier who by reason of wounds or illness resulting from the war has thereby suffered an important and permanent diminution of professional capacity, his civil status, his military situation, the nature of his invalidity, his previous occupation, and the new occupation he may have adopted because of his invalidity.

2. To maintain a list of work and employment available to disabled soldiers, distinguishing the kinds of employment suitable for each type of invalidity.

3. To coordinate all information received from institutions dealing with disabled soldiers and keep a statistical record of situations filled by them.

4. To collect all legislative and other documents relative to the treatment of disabled soldiers in France and abroad.

5. To unite in a common effort all departmental and local organizations for the welfare of disabled soldiers.

The national office does not concern itself with those wholly disabled and permanently unable to do any kind of work, and these are pensioned in proportion to their needs.

A man who is capable of reeducation for industrial employment is given the reeducation, and then work is found for him preferably "in his former employment [and locality], for which he would have the great advantage of knowing all the technical details of the work, in which he would have the sympathy of his fellow workers and the support of his trade-union, and in which he would be able to earn a greater or smaller proportion of his former wages, the State giving him a pension more or less the equivalent of that portion he can not earn." Artificial limbs are made suitable to the performance of his particular work. The office sees that there is an organization in every industrial district to provide technical reeducation and subsequent employment for the men who joined the army in that district. The scheme comprehends 101 institutions and four schools (schools and prothesis workshop) for reeducation, and a large number of centers of surgical equipment will be established in every region of France. About 10 centers, in addition, are independently organized by the ministry of wàr for the disabled prior to their discharge from the army.

Difficulty is experienced in getting the peasant to return to agriculture, so that if he insists upon his inability to resume it he is given the option of learning and undertaking poultry or beekeeping, horticulture, cheese or butter making, market gardening, and similar pursuits allied to general farming.

Centers of physiotherapy are calculated to care for "functional wounds," impaired muscular or articular functions, by means of mechanical appliances, heat, electric-light baths, water, gymnastics, massage, electricity, and radium emanations. Very striking results have been achieved at these institutions.

The average incapacity of patients during the month of December, 1915, on entering was 28.11, and on leaving, 0.96. During the four months ending December 31, 1915, 1,780 "functionally wounded" men, whose morbid condition had existed for an average period of six months before their treatment, were returned to the military depots, 290 to base duties, and 92 recommended for discharge at a gain to the State on their pensions and allowances represented by a capital sum of 10,000,000 francs.

The schools of reeducation receive men from the centers of surgical equipment and centers of physiotherapy. They are open to all discharged soldiers and sailors recognized. They may come either as boarders or as day scholars. During this time those who are in receipt of a provisional pension of 1.7 francs (32.8 cents) per day pay 1.2 francs (23.2 cents) of this to the school, keeping the remaining 0.5 franc (9.6 cents) as pocket money. When they receive their final military discharge and pension they are admitted gratuitously. Boarders are provided with food, lodging, washing, lighting, and heating. Day scholars receive 10.1 cents a day and keep their pension as well. Half of all pensions is retained, to be given in a single sum when the student leaves. The hours of work are eight per day. When men produce goods which are sold they receive the balance, less 10 per cent, left after deducting the cost of raw materials. Prizes are given for special diligence, and these often take the form of an outfit of tools for the trade which has been learned. The disabled man chooses what trade he will be taught and may change to another if he thinks he could do better at it. Any man is free to leave at any moment, only moral pressure being applied to induce him to stay until he is really equipped to earn a living. The average time taken to train men to earn their living at different trades is stated by the director of this school to be as follows, based upon 16 months' experience, with about 700 men:

Clerk, 3 months.
Draftsman, 10–12 months.

Leather worker, 8 months.

Shoemaker, 6 months for repair work.

Shoemaker, 8 months for repair work and new work.

Mechanic, 6 months.

Tailor, 8 months.

Tinsmith, 4 months for a town workshop.

Tinsmith, 8 months to work on his own account in the country.

In separate temporary buildings in the grounds a number of expert mechanics, released from the army for the purpose, were making artificial limbs and other surgical appliances. Plaster of Paris casts were made of the stumps of limbs or other injured parts of the body to be fitted, and of one whole leg when another leg was to be made to match it. This was admirably done, and of course obviated the necessity of repeated and tiresome fitting and trying on. The artificial limbs made here were of steel, leather, and felt of beautiful workmanship, but they appeared to me rather elaborate, expensive, and heavy.

Many of the men in training are not discharged men but are still in the army and therefore subject to discipline. Most of them are finally discharged when their medical treatment and school training are completed. Almost all trades and employments are taught: Bookkeeping, draftsmanship, typewriting, shorthand, English, harness making, shoemaking, hairdressing, carpentry, cabinetmaking, tinsmith's work, mechanics, tailoring, soap making, etc. Each workshop is under charge of a "foreman" or "professor," who was at first himself a maimed man, but now, since the military authorities took too many of these best men back into auxiliary services, is a civilian expert paid a regular salary. The men work (including their medical treatment) seven hours a day, and they are paid 2 cents an hour, rising to 4.1 cents as they advance in skill. They do work for the army or the public, or the product of their labor is sold commercially.

Dr. Vallée states "his fundamental aim to be to give the maimed man a genuine professional value, enabling him to resume his place in social life and to gain honorably his livelihood." To this end, the first question he puts to himself with regard to each man is: Can he be fitted to return to his previous employment? If so, every effort is made to enable him to do so, and he is reeducated in the appropriate workshop. If this is impossible—as when, for instance, a man who has been a carpenter can no longer climb a ladder—then he is trained in the job most nearly resembling his old one, to make use of as much as possible of his previous professional knowledge. Thus a disabled carpenter should become some kind of a woodworker, or a disabled plumber a tinsmith. The choice of a trade should depend upon a man's previous knowledge combined with his actual physical aptitude.

An employment bureau has been established, which corresponds with employers of labor in the district to which the men belong, and places have already been found for a good many men. All the usual trades are taught in this school (Maison Blanche). Some officers are in the bookkeeping class, but men are learning basket work and leather work, shoemaking, french-polishing, and wood carving. Dr. Kresser has purchased 50 acres of land and hopes to start before long an agricultural school, in which will be taught farmyard work, beekeeping, and the use of motor tractors. He is strongly of opinion that professional reeducation should be made obligatory since, if men do not take up any work, the effect of the months of aimless unoccupied hospital life is to render them useless later on.

Ondes has 90 beds. The course of instruction lasts three months, and 300 men per year receive an agricultural training. The subjects taught are farm work, vineyard and nursery gardening, horticulture, blacksmithing, carpentry, and basketwork. An employment bureau has been established, but there are many more places offered than men to fill them. The director's report contains the following passage, and expresses the general feeling on this subject: "It appears to us indispensable that the disabled man should be reeducated while he is still a soldier; that is, while still subject to military discipline. Once become a civilian, the disabled man, almost in spite of himself, has but one wish—to return home, even if he vegetates there."

Juvisy is a small town on the Seine, about 20 miles from Paris, which, in addition to being an agricultural training school, is also a center of physiotherapy. Near Juvisy is a farm of 1,000 acres, and over 100 acres of this, together with farm buildings, has been taken on a three-years' lease for the purpose of training disabled men. Everything is provided for agriculture and rural industries, including cow houses, stables, dairies, piggeries, fowl houses, kennels, while a large garage and motor shop is being erected for the study of agricultural tractors. Although this school is primarily designed for men with all their limbs—of course, in a more or less disabled condition—it is intended to add to the number a few men with artificial limbs. This school is a free gift to France from foreign sympathizers, and it is hoped that the whole of the 1,000 acres will eventually be taken over. This school has been so recently established that it is impossible to say how far it is likely to be successful, but much money and thought is being expended upon the treatment that is there given, one of the main objects being to save men for country life, first by restoring to them, as far as possible, the use of their disabled limbs, and, secondly, by teaching them the principles and practice of subsidiary rural industries by which they can earn a good livelihood on the land they already possess.

There are two main institutions for the training of blind soldiers in France. One is the Maison de Convalescence, at Reuilly, and the other is Le Phare de France, in the rue Daru, Paris. The Maison de Convalescence was opened on March 29, 1915. It was erected by the ministry of the interior, but is partly dependent upon the ministry of war, since it receives undischarged soldiers. The State contributes 2.5 francs (48.3 cents) per man a day, and the difference is made up by an allowance from the budget of the hospital.

A further important contribution, without which the benevolent activity of the school would be greatly diminished, is made by a charitable society, known as L'oeuvre des Amis Soldats Aveugles, supported by contributions from French sympathizers in many parts of the world. A gift of 100,000 francs ($19,300), for instance, has been received from South America. This society presents an outfit of tools for his trade to every man leaving, and gives him a supply of raw material to start with, until his handicraft begins to bring in money. It also gives the man an outfit of clothing, called his "trousseau." It presents him with 500 francs ($96.50) on his marriage—30 men have married from the school—and treats all his comrades to coffee and a cigar on his wedding day. It also buys raw material in commercial quantities, and resells it at cost price to the men after they have set up business for themselves. It has, for example, just bought $58,398 worth of fiber for household brushes. In a word, the society adds a humanizing factor to the bare essentials provided by the State. Doubtless, the cheerfulness and briskness of the blind men throughout the school was a reflection of this wise and intelligent sympathy.

The school has 233 beds, and also receives a number of men who live in the neighborhood. Altogether it has had about 500 men in training, and about 300 have left it with a handicraft by which they can make a living. The director is Monsieur Emard. The subjects taught are brush making, basket making, typewriting, piano tuning, net making, upholstery fringes, cooperage, and massage.

The Phare de France was founded and is directed by Miss Winifred Holt, an American lady, who for many years devoted herself to the care of the blind in the United States. The funds are raised by an influential committee in America, and this Paris "lighthouse" was established in a large and pleasant house in the fashionable quarter of Paris. The esteem in which Miss Holt and her work are held is shown by a recent official visit of the President of the Republic and the fact that she is allowed to take for training any blind soldier she may find in a hospital. The Phare de France was opened on August 18, 1916, so that there has not yet been time for complete training. Officers and men are alike admitted, 43 in residence and about 20 living outside. Intelligence and industry, besides total blindness, are the only qualifications for admission.

The subjects taught range over a wide field and include more of what may be called the humanities than is usually found in such institutions—artistic pottery work, for example, which is stenciled by the blind, mathematics, music, foreign languages, weaving on elaborate looms, etc.

The Phare leaves the impression of a happy house party or a social center rather than an institution. The pupils clearly regard the place as a home, and blind officers and their friends come in to tea almost as in a club, sure of a hearty welcome and a pleasant hour of conversation, and music and laughter. This atmosphere is due, first, to Miss Holt's long experience with the blind, and, second, to her own sunny and energetic temperament, which diffuses cheerfulness and vivacity wherever she passes.

It is hoped to establish similar "lighthouses" in other parts of France.

Miss Holt's admirable and devoted work seems to supply a need hitherto unmet in France, whereby officers and those blind who require it may adapt themselves to an occupied but more or less leisure life, rather than to the training of those who will have to return to a workingman's environment and earn their livelihood at a trade.

Sir Henry Norman, in commenting on the conclusions to which he arrived, makes the following statement concerning the treatment of the blind soldiers in England:

"The training of the blind French soldier at the Maison de Convalesence suggests several considerations bearing upon our own treatment of this problem.

"First, the industrial training of the blind should be genuine professional training, not the well-meant efforts of amateurs. A man should be taught by a professional, the work he does should be work having a definite industrial and commercial value, and his training should not be regarded as complete until it has been a thorough apprenticeship, rendering him capable of doing industrial work with accuracy and at fair speed.

"In this connection it may be said that the best teacher will probably be found to be a man who was an expert at his job and has himself become blind.

"No handicraft should be permanently taught, the product of which requires an appeal to charitable sentiment for its disposal.

"Second, besides the teaching of what may be called the coarser kinds of work, advantage should be taken, in case of suitable men, of the qualities in which the blind man excels the seeing man to train the former to do work on a higher intellectual level. The blind man's superiorities lie (1) in the exquisite development of the sense of touch, (2) his infinite patience, and (3) the pride he takes in the excellence of his workmanship. Clearly, therefore, precision work involving repetition is peculiarly suitable to the blind.

"Indeed, 'repetition' in the workshop sense of the word will be found to lie at the basis of a blind man's success. He is unduly handicapped in making a number of different parts and assembling them, whereas he is specially capable of dealing with a large number of identical parts requiring careful finishing.

"In conclusion, this French experience shows that a blind soldier, if wisely and efficiently trained, may be restored to a higher degree of industrial efficiency, bringing with it greater earning power than he possessed before his loss of sight."

It is impossible to give any adequate account of that portion of the report which deals with the work in prothesis by Prof. Amar, who for many years has studied the problems of the physiology of the workman performing the work of his trade. Up to the present he has restored to work about 1,300 men. "Prothesis" is the Greek word meaning "addition," and signifies the provision of artificial apparatus to perform, so far as possible, the work of an amputated limb or replace a lost function.

The Amar system of prothesis comprises in every case three stages:

1. The investigation of physical fatigue and mental aptitude. That is a scientific determination of exactly what is physically left to the man as the result of his wound and amputation, and what his mental coefficient is.

2. Education of the amputated man's stump in sensitiveness.

3. Education of the complete limb, consisting now of both stump and artificial limb.

It is only when the man has passed through these three stages that his "professional reeducation"—that is, his training to perform his actual industrial job—takes place.

Suggestions of an administrative nature, based upon the experience of France and the United Kingdom, are appended to this study, but would not necessarily apply to America unless similar organizations were in being or contemplated and the percentage of disabled assumes relative proportions. These suggestions may be found reprinted in the Monthly Review of the United States Bureau of Labor Statistics for June 1917, Vol. IV, No. 6. [Measures already undertaken by the Government of Canada to rehabilitate in productive employment the disabled from her expeditionary forces are also to be found in this same Monthly Review, pages 867 et seq. The reviewer from a recent visit to France can attest to the enthusiasm with which regular army medical officers take up such work as physiotherapy.] (C. N. F.)

REPORTS.

REPORT OF CEREBRO-SPINAL FEVER IN THE ATLANTIC FLEET.

By C. P. KINDLEBERGER, Medical Inspector, United States Navy.

From July 1 to December 31, 1916, there were no cases of cerebro-spinal fever in the Atlantic fleet. The following interesting case was admitted to the sick list of the *Pennsylvania* on February 16, 1917 (notes taken from the health record):

"H. C. C. A-S.—Age, 19. Diagnosis—Meningitis, cerebro-spinal. Brought to sick bay at 5:30 a. m., after he had gotten out of his hammock and fallen to the deck. Patient appeared at the dispensary yesterday, complaining of frontal headache. Temperature, 99.4 F.; pulse, 42; respiration, 16; sluggish reaction of pupils to light; unable to arouse him to reply to questions; Kernig's and Brudzinski's signs positive; rigidity of post cervical muscles noted; showed mental attitude characteristic of meningitis; vomited twice during day; W. B. C., 12,000. Lumbar puncture at 7 p. m.: 40 mils cerebro-spinal fluid withdrawn and 20 mils Flexner's serum injected—spinal fluid cloudy and pink; W. B. C., 5,000 per cubic millimeter; also contained numerous red-blood cells. Culture on blood serum showed large actively motile gram-positive bacillus, later identified as belonging to subtilis group, 2-17-17. Lumbar puncture: 20 mils spinal fluid withdrawn and 20 mils Flexner's serum injected. Fluid slightly pink and decidedly cloudy; culture showed same bacillus as above (bipolar staining with methylene blue). Discharged to duty, March 6, 1917, well." Patient subsequently developed insufficiency of ocular muscles, for which glasses were prescribed on the *Solace*, to be worn for 3 to 6 months.

This case was not considered one of cerebro-spinal fever, for the following reasons: A subtilislike bacillus was found twice in the spinal fluid, in pure culture; meningococci were never found; patient recovered promptly, without serious sequelae, after two lumbar punctures and injections of Flexner's serum; no other cases of meningitis have occurred on board, up to the present time (August 30); patient had been on the *Pennsylvania* for eight months when he was taken ill, and influenza was quite prevalent at the time he was admitted.

From January 1 to March 25, 1917, we may then safely say that cerebro-spinal fever was absent from the ships of the Atlantic fleet. On the latter date a mess attendant from the *Walke* was sent to the Norfolk Naval Hospital with this disease. No further cases developed until April 13, when a case was sent from the *Missouri* to the Philadelphia Naval Hospital. After this there was an interval of four days before the disease began to appear daily on a number of the ships.

The onset of the disease in epidemic form can be traced to several causes, namely:

1. The unusual prevalence of cerebro-spinal fever and other contagious diseases in all parts of the United States at that time.
2. Rapid recruiting and marked increase in the size of the Navy after the declaration of war.
3. The military necessity for transferring recruits to the fleet from the training stations *without the usual period of detention* and weeding out of the physically unfit.
4. The overcrowding and at times lack of sufficient clothing and bedding at these stations and on some of the ships of the fleet.
5. The presence of infected individuals and "carriers" among the recruits.

When the epidemic started the following general sanitary rules and regulations were promulgated and strictly enforced:

(*a*) Transfer actual or suspected cases of contagious diseases to the hospital ship or hospital immediately.

(*b*) Air bedding daily and keep ship open to air and sunshine as much as possible.

(*c*) When recruits are received give bichloride bath, spray nose and throat, disinfect clothing, inspect daily, and isolate if practicable.

(*d*) Recruits shall be kept and drilled and worked in the open air as much as possible.

(*e*) The habit of sleeping on deck (except on the main deck) shall be forbidden.

(*f*) The cups of the fountain drinking device on the scuttle butts shall be sterilized daily.

(*g*) Spit kids shall be thoroughly cleaned and supplied with a disinfectant solution (formaldehyd) three times a day.

(*h*) A dampener (wet sand or paper) shall be scattered on the decks of the living spaces before sweeping.

(*i*) Swabs used between decks shall be cleaned daily by boiling or washing and then aired.

(*j*) The water used for cleaning the gun and berth decks shall contain a disinfecting solution (cresol).

An attempt was made to detect "carriers" by staining smears from the nose and throat, but none were discovered by this method. This result was to be expected, in view of the following: "Carriers of meningococci can only be detected by cultural methods; stained smears from the nose and throat are useless for this purpose" (Amoss and Chickering).

The data recorded in the following table were obtained from the ships on which cerebro-spinal fever appeared from the hospital ship *Solace* and from the several naval hospitals to which the patients were finally transferred. From March 25 to August 7, 1917, 118 cases are listed in chronological order.

At the present time the epidemic is practically over. Unless we can discover all the "carriers" and no more infected recruits are transferred to the fleet, we may expect to have sporadic cases at irregular intervals for some time yet. Recently health conditions at the training stations have greatly improved. Recruits are now properly clothed, well fed, and adequately housed in well-constructed sanitary barracks, erected since the beginning of the war. They are held as long as possible, and the physically and mentally unfit are being rapidly weeded out. Every effort is also being made to detect and eliminate "carriers" and those suffering with prodromal or actual symptoms of contagious diseases from the drafts, transferred from time to time to the ships of the fleet.

As suggested in an editorial in the July, 1917, number of the UNITED STATES NAVAL MEDICAL BULLETIN, the ideal method of eliminating the physically and mentally unfit from the naval service would be to enlist the aid of a number of patriotic specialists in every recruiting district. It is, of course, realized that this method could not be properly carried out in war time. After a recruit has been given the usual physical examination he could be provisionally accepted, and then sent to the above-mentioned specialists for further examination. Cultures should be taken from the nasopharynx to detect "carriers"; the blood, urine, and feces critically examined; the eyes, ears, nose, and throat carefully gone over; a Wassermann test made; a skiagraph of the chest taken or a Von Pirquet or Calmette reaction studied; the presence of a stricture or chronic gonorrhea determined; the feet examined by an orthopedist; and tests undertaken by an alienist to determine recruit's mental age and condition.

United States Atlantic Fleet—U. S. S. Pennsylvania, Flagship.

CEREBRO-SPINAL FEVER.

Initials.	Rate.	Age.	Ship.	How long on board.	From what station or ship received.	Date admission.	Type of case.	Symptoms of special interest and complications.	Meningococcus found.	Disposition (obtained from hospital).	Comment.
A. M.	MsA-3		Walke			Mar. 25				To duty	Transferred to Naval Hospital, Norfolk.
L. R. L.	Sea-2	20	Missouri	14 days	Great Lakes Training Station.	Apr. 13	Ordinary	Marked delirium		do.	Transferred to Naval Hospital, Philadelphia.
P. W. B.	do.	20	Arizona	3 days	do.	Apr. 17	do.			Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
C. H. K.	do.	20	Connecticut	2 days	do.	do.	Fulminant.	Respiratory influenza.		do.	Do.
T. C. R.	do.		Great Lakes Training Station.		do.	do.	Ordinary			do.	Do.
C. O. H.	do.	24	New York	18 days	do.	Apr. 18	do.	Petechial rash		do.	Do.
O. J. H.	Sea	22	Connecticut	6 mos	U. S. S. Vermont	Apr. 21	Fulminant.	Respiratory influenza.		Died	Do.
R. L. H.	AS	17	do.	6 days	Great Lakes Training Station.	do.	Ordinary			Convalescent.	Do.
C. D. A.	do.	16	Delaware	2 days	do.	do.	do.	Petechial rash	Yes	do.	Do.
F. B.	Sea-2	21	Arizona	20 days	do.	Apr. 22	do.			do.	Do.
C. M. H.	do.	21	Connecticut	7 days	do.	do.	Fulminant.	Respiratory influenza.		do.	Transferred to Naval Hospital, Norfolk.
W. J. H.	do.	19	do.	do.	do.	do.	do.	do.		do.	Do.
F. C.	do.	20	New York	do.	do.	do.	Ordinary	Petechial rash; tonic spasm.		do.	Do.
C. H. B.	AS NNV	19	North Carolina	29 days	Connecticut Naval Militia.	do.	do.	Petechial rash; Kernig's.	Yes	Died	Transferred to Naval Hospital, Portsmouth.
L. J. A.	Sea-2	18	Arizona	7 days	Great Lakes Training Station.	Apr. 23	do.	Mastoiditis operation.		Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
J. S.	AS	19	Arkansas	8 days	do.	do.	do.			Died	On board.
W. L.	Sea-2	16	Wyoming	11 days	do.	do.	do.	Simulating influenza	Yes	Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk
D. W. A.	do.	19	Arizona	8 days	do.	Apr. 24	do.			do.	Do.
B. N. L.	Sea	22	Connecticut	1 year	do.	do.	do.	Profuse purpura		do.	Transferred to Naval Hospital, Norfolk.
M. E. J.	Sea-2	19	New York	10 mos	do.	do.	Fulminant.	Petechial rash; stiff neck.		Died	Do.
W. H. G.	do.	18	Michigan	9 days	do.	do.	Ordinary	Pan-ophthalmitis		Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.

E. L. W.	do.	16	do.	Do.	do.	do.	do.			do.	Transferred to Naval Hospital, Norfolk.
J. McN.	do.	19	do.	7 days.	do.	do.	Fulminant.			Died.	Do.
C. R. H.	do.	21	Connecticut.	10 days.	do.	Apr. 25	do.	Respiratory influenza.		do.	Transferred to *Solace* and Naval Hospital, Norfolk.
H. R. R.	do.	17	Michigan.	8 days.	do.	do.	Ordinary.				Transferred to *Solace*.
O. L. E.	do.	17	Utah.	10 days.	do.	do.	do.			Died.	Transferred to *Solace* and Naval Hospital, Norfolk.
F. W. R.	do.	18	Alabama.	47 days.	Newport Training Station.	do.	do.			Convalescent.	Transferred to Naval Hospital, Norfolk.
L. W. B.	do.	19	Arizona.	20 days.	Great Lakes Training Station.	Apr. 26	do.			Died.	On board.
G. M. W.	AS.	17	Arkansas.	4 days.	do.	do.	do.	Membrane on tonsil-rash.	Yes.	Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
R. T.	F-2.	20	Baltimore.	21 days.	Newport Training Station.	do.	Fulminant.			Died.	Do.
L. H. T.	Sea-2.	16	Connecticut.	7 days.	Great Lakes Training Station.	do.	Ordinary.			Convalescent.	Do.
C. C. B.	do.	18	Arizona.	21 days.	do.	Apr. 27	do.			do.	Do.
F. E. D.	F-3.	19	Connecticut.	8 days.	do.	do.	Fulminant.	Respiratory influenza.		do.	Do.
M. J. A.	Sea-2.	18	North Dakota.	34 days.	Newport Training Station.	do.	do.	Early stupor—no rigidity.		Died.	Transferred to *Solace*.
A. O. S.	SC-2.	32	Fanning.			do.	Ordinary.	A with strychnine poisoning.		Convalescent.	Transferred to Naval Hospital, Philadelphia.
S. R.	Sea-2.	19	Arizona.	14 days.	Great Lakes Training Station.	Apr. 28	do.			do.	Transferred to *Solace* and Naval Hospital, Norfolk.
A. G. E.	F-3.	18	Connecticut.	9 days.	do.	do.	Fulminant.	Respiratory influenza.		Died.	Transferred to *Solace*.
C. A. K.	do.	18	do.	15 days.	do.	do.	do.	do.			Reedy Island Quarantine Station.
N. H.	Sea-2.	18	Michigan.	2 days.	do.	do.	Ordinary.			Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
S. C.	do.	17	Alabama.	15 days.	Newport Training Station.	do.	Fulminant.			Died.	Transferred to *Solace*.
R. R.	do.	17	Montgomery.	1 day.	R. S., Norfolk.	do.	do.	Fell on deck in stupor.		do.	Transferred to Naval Hospital, Norfolk.
J. L. B.	do.	17	Arizona.	14 days.	Great Lakes Training Station.	do.	Ordinary.			do.	Transferred to *Solace* and Naval Hospital, Norfolk.
H. E. C.	do.	18	Michigan.	40 days.	U. S. S. Prairie.	Apr. 29	do.				Transferred to *Solace*.
A. J. C.	do.	18	New York.	15 days.	Great Lakes Training Station.	Apr. 30	do.	Petechial rash marked.	Yes.	Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
J. C. P.	AS.	18	Arkansas.	34 days.	do.	do.	do.			do.	Do.
W. M.	Sea-2	18	Montana.	9 days.	do.	May 1	do.	D with malaria 5 days before A.		do.	Transferred to Naval Hospital, Norfolk.

United States Atlantic Fleet—U. S. S. Pennsylvania, Flagship—Continued.

CEREBRO-SPINAL FEVER—Continued.

Initials.	Rate.	Age.	Ship.	How long on board.	From what station or ship received.	Date admission.	Type of case.	Symptoms of special interest and complications.	Meningococcus found.	Disposition (obtained from hospital).	Comment.
J. G. C.	Sea-2	20	Baltimore	6 days	Norfolk Training Station.	May 1	Ordinary			Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
D. D. B.	do	20	Arizona	8 days	Great Lakes Training Station.	May 2	do			do	Do.
W. C.	do	16	Prometheus	do	R. S., Norfolk	do	Fulminant.	Paralysis eye muscles.		do	Transferred to Naval Hospital, Norfolk.
C. H. F.	do	19	Seattle	6 days	Newport Training Station.	May 3	do	Albuminuria	Yes	do	Transferred to *Solace* and Naval Hospital, Norfolk.
R. L. M.	Pvt. M. C.	21	Utah	7 mos.	Marine Barracks, Norfolk.	May 4	Ordinary	Admitted with measles		do	Do.
G. A.	MsA-3	21	Arizona	6 mos	R. S., New York	May 5	do			do	Do.
T. O. J.	Sea-2	23	Arkansas	13 days	Great Lakes Training Station.	do	Fulminant.	Exudate on tonsils	Yes	Died	Transferred to *Solace*.
E. A. M.	do	18	do	12 days	do	do	Ordinary	Petechial rash	do	Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
W. R.	As	18	Delaware	37 days	Newport Training Station.	May 6	do		do		Transferred to *Solace*.
L. M. H.	do	19	Florida	17 days	Great Lakes Training Station.	do	Fulminant.	Petechial rash		Died	Transferred to *Solace* and Naval Hospital, Norfolk.
C. A. C.	Sea-2	23	Montana	13 days	do	do	Ordinary			To duty	Transferred to Naval Hospital, Norfolk.
M. H.	F-2		Rowen			do	Fulminant.			Died	Do.
S. A. W.	Sea-2	19	Oklahoma	24 days	R. S., Norfolk	do	Ordinary	Pneumonia and Pleurisy.		Convalescent.	Do.
W. E. T.	AS	17	Delaware	12 days	Newport Training Station.	do	do			do	Do.
L. F. B.	Sea-2	16	Arizona	20 days	Great Lakes Training Station.	May 7	do			do	Transferred to *Solace* and Naval Hospital, Norfolk.
C. F. P.	Lt	30	Arkansas	60 days	U. S. S. Florida	do	do			do	Transferred to Naval Hospital, Boston.
H. R. M.	Pvt. M. C.	21	New York	13 mos	Marine Barracks, New York.	do	Fulminant.			do	Transferred to Naval Hospital, Norfolk.
C. C. B.	Sea-2	16	Arizona	20 days	Great Lakes Training Station.	May 8	Ordinary			Died	Transferred to *Solace* and Naval Hospital, Norfolk.

T. M. C.	F-3.	19	Vestal.	18 days.	R. S., Norfolk.	do.	do.			Convalescent.	Transferred to Naval Hospital, Norfolk.
R. M. C.	Sea-2.	18	Nebraska.	20 days.	Great Lakes Training Station.	May 9	do.			do.	Transferred to *Solace* and Naval Hospital, Norfolk.
A. B. O.	do.	17	Montgomery.	11 days.	R. S., Norfolk.	do.	Fulminant.			Died.	Transferred to Naval Hospital, Norfolk.
M. C. S.	do.	18	Florida.	25 days.	Great Lakes Training Station.	May 12	Ordinary.	High temperature.		Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
G. W. C.	do.	18	Baltimore.	20 days.	Norfolk Training Station.	May 14	Fulminant.	Symptoms of drug poisoning.		Died.	Transferred to Naval Hospital, Portsmouth.
S. McM.	WT.	34	Maine.	11 mos.	R. S., New York.	May 15	do.	Mania.	Yes.	do	Transferred to Naval Hospital, New York.
H. A. P.	Sea-2.	17	Arizona.	30 days.	Newport Training Station.	May 17	Ordinary.	Mumps.		Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
N. C. B.	do.	20	Michigan.	15 days.	Great Lakes Training Station.	do.	do.		Yes.	do.	Do.
J. V. R.	do.	20	North Dakota.	57 days.	do.	do.	do.	Early rigidity of muscles.		do.	Do.
C. A. K.	do.	18	Connecticut.	30 days.	do.	May 18	do.			do.	Transferred to Naval Hospital Philadelphia.
M. R.	SC-2.	23	Minnesota.	3½ years.	R. S., Norfolk	May 20	Fulminant.			Died.	Transferred to *Solace* and Naval Hospital, Norfolk.
R. W. B.	Sea-2.	18	Prometheus.	31 days.	U. S. S. Vestal.	do.	Ordinary.			Convalescent.	Transferred to Naval Hospital, Norfolk.
B. G. C.	AS.	16	do	23 days.	R. S., Norfolk	do.	do.				Transferred to *Solace* and Naval Hospital, Washington.
W. R. S.	F-2.	27	Jupiter.	7 mos.	do.	May 21	do.		Yes.	Convalescent.	Transferred to Naval Hospital, New York.
C. V. B.	AS.	17	do	29 days.	Great Lakes Training Station.	do.	do.				Transferred to *Solace* and Naval Hospital, Washington.
H. L. G.	Sea-2.	23	Montana.	30 days.	do.	May 22	Fulminant.			Died.	Transferred to Naval Hospital, Norfolk.
J. H. C.	do.	23	Wisconsin.	32 days.	N. N. V. New York.	May 24	Ordinary.	Kernig's and Babinski's positive.		Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
R. E. R.	do.	17	Michigan.	33 days.	Great Lakes Training Station.	do.	do.			Died.	Do.
K. R. C.	do.	21	Vermont.	60 days.	do.	May 26	do.		Yes.	Convalescent.	Transferred to Naval Hospital Philadelphia.
A. J. L.	do.	17	do.	38 days.	Newport Training Station.	do.	do.			do.	Do.
H. L. C.	do.	17	Georgia.	60 days.	U. S. S. Georgia.	May 27	do.	Mania.		do.	Transferred to Naval Hospital, Boston.

United States Atlantic Fleet—U. S. S. Pennsylvania, Flagship—Continued.

CEREBRO-SPINAL FEVER—Continued.

Initials.	Rate.	Age.	Ship.	How long on board.	From what station or ship received.	Date admission.	Type of case.	Symptoms of special interest and complications.	Meningococcus found.	Disposition (obtained from hospitals).	Comment.
S. R. L.	F-2	20	Michigan	1¾ years.	Newport Training Station.	May 28	Ordinary		Yes	Conualescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
J. H. H.	Sea-2	19	Seattle	30 days	do	do	Fulminant.		do	do	Do.
J. P.	F-3	22	South Carolina	9 days	R. S., Norfolk	May 30	do		do	Died	On board.
R. C. G.	do	21	Dixie			May 31	do	Measles		Convalescent.	Transferred to Naval Hospital, Philadelphia.
H. M.	Sea-2	19	Florida	25 days	U. S. S. Kentucky	do	Ordinary	do		do	Transferred to *Solace* and Naval Hospital, Norfolk.
A. B. J.	AS	20	Texas	30 days	Portsmouth, N. H.	June 2	do	Pronounced endocarditis ac.		Died	Transferred to *Solace*.
C. F. M.	Sea-2	17	Montana	41 days	Great Lakes Training Station.	June 3	Fulminant.			do	On board.
G. M. N.	do	20	Vestal	1 day	do	do	Ordinary	Kernig's positive		Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
M. S. S.	F-3	20	Utah	4 days	R. S., Norfolk	June 4	do	Admitted with malaria	Yes	do	Do.
C. E. R.	Sea-2	19	Kentucky	10 days	Norfolk Training Station.	do	do			do	Transferred to Naval Hospital, Norfolk.
G. S. W.	F-3	22	Utah	6 days	R. S., Norfolk	June 6	do			do	Transferred to *Solace* and Naval Hospital, Norfolk.
J. F. H.	Sea-2	17	Michigan	1 year	Newport Training Station.	do	do			do	Do.
J. F. U.	F-3	19	Nevada	34 days	R. S., New York	June 10	do	Measles		do	Do.
F. H. B.	do	21	Wisconsin	19 days	U. S. S. New York	June 13	Fulminant.	Admitted with typhoid fever.	Yes	Died	Transferred to *Solace*.
J. T. H.	WT	25	Wyoming	3 years	U. S. S. Alabama	June 14	Ordinary	Symptoms of influenza	do	Convalescent.	Transferred to *Solace* and Naval Hospital, Norfolk.
J. G. B.	Sea-2	19	Arizona	7 mos.	U. S. S. New Hampshire.	June 15	do		do	do	Do.
P. J. K.	F-2	26	Vermont	6 mos.	R. S., Boston	do	do		do	do	Transferred to Naval Hospital, Philadelphia.
C. W. P.	Sea-2	19	do	53 days	Newport Training Station.	do	do		do	do	Do.
J. R. W.	AS	20	Von Steuben	1 day	R. S., Philadelphia	do	do		do	do	Do.

G. S. H....	Sea-2......	18	Utah..........	7 days...	R. S., Norfolk	June 16	.....do......	....	....	.....do........	Transferred to Nava Hospital, Norfolk.
J. W. C....	Y-2.......	17	Von Steuben..	...do	R. S., Philadelphia....	June 18	.....do......	Paralysis right arm....	Yes...	.....do........	Transferred to Naval Hospital, Philadelphia.
M. B......	Sea. NNV.	22	Vermont......	60 days..	Chicago, Ill...........	June 21	.....do......	Pneumonia, broncho..	...do...	.....do........	Do.
C. F. S....	Sea-2......	18	Nevada.......	63 days..	R. S., Norfolk	...do.....	.....do......	Complained only of headache.	....	.....do........	Transferred to *Solace* and Naval Hospital, Norfolk.
J. E. G....	F-3.......	21	Michigan......	24 days..	R. S., Boston.........	June 24	.....do......	Mumps................	Yes...	.....do........	Transferred to Naval Hospital, Norfolk.
R. M. S....	Sea-2.....	22	.....do.........	23 days..	Puget Sound..........	June 25	.....do......	....	....	.....do........	Do.
C. C. C....	...do.......	17	Rhode Island .	19 days..	Newport Training Station.	June 27	.....do......	Admitted with mumps	....	.....do........	Do.
A. DeR....	...do.......	18	Oklahoma.....	39 days..	Great Lakes Training Station.	June 28	Fulminant.	....	....	Died.........	On board.
F. X. W...	F-3.......	19	Arizona.......	36 days..	Newport Training Station.	July 13	Ordinary...	....	Yes...	.....do........	Transferred to Naval Hospital, New York.
H. D. L...	Mid-3.....	20	Oklahoma.....	58 days..	Naval Academy.......	July 17	.....do......	Petechial rash marked.	...do...	Convalescent.	Transferred to *Solace*.
H. E. R...	PhM-1....	21	Wisconsin.....	75 days..	U. S. S. Iowa..........	July 18	Fulminant.	....	....	Died.........	Do.
L. L. T....	Blks......	25	Oklahoma.....	7 mos....	R. S., Norfolk	July 20	Ordinary ..	Petechial rash.........	....	....	Transferred to *Solace* and Naval Hospital, Norfolk.
A. E. S....	Sea........	21	Connecticut...	2 years..	Naval Hospital, Philadelphia.	Aug. 5	Fulminant.	Macular eruption—Kernig's.	....	....	Do.
W. H. B...	Ens. NNV	41	Kearsarge.....	4 mos....	Massachusetts Naval Militia.	Aug. 7	.....do......	....	....	Died.........	Transferred to Naval Hospital, Boston.

NOTE.—July 27, Charleston reports one cerebro-spinal fever "suspect" transferred to naval hospital; no report of confirmation of diagnosis received to date (Aug. 30).

Summary:

Cases		118
Cases discharged to duty		3
Cases under treatment		76
Deaths (27.11 per cent)		32
Final disposition not known		7
Transferred to *Solace*		67
Transferred to *Solace* and Naval Hospital, Norfolk, Va		80
To *Solace* and Naval Hospital, Norfolk	53	
To Naval Hospital, Norfolk, direct	27	
Other naval hospitals		21

Vessel.	Number of cases.	Vessel.	Number of cases.
Alabama	1	Nebraska	1
Arizona	15	Nevada	2
Arkansas	6	New York	5
Baltimore	3	North Carolina	1
Connecticut	13	North Dakota	2
Delaware	3	Oklahoma	4
Dixie	1	Prometheus	4
Fanning	1	Rhode Island	1
Florida	3	Rowen	1
Georgia	1	Seattle	2
Great Lakes Training Station	[1] 1	South Carolina	1
Jupiter	1	Texas	1
Kearsarge	1	Utah	5
Kentucky	1	Vermont	5
Maine	1	Vestal	2
Michigan	12	Von Steuben	2
Missouri	1	Walke	1
Minnesota	1	Wisconsin	3
Montana	4	Wyoming	2
Montgomery	2		

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[1] This patient was taken ill en route from the Great Lakes Training Station to the fleet; he was not transferred to a ship, but to the Naval Hospital, Norfolk, Va., via *Solace*.

Ordinary cases	83
Fulminant cases	34
Not known	1
Number received from—	
Great Lakes Training Station	55
Norfolk Training Station	3
Newport Training Station	15
R. S., *Norfolk*	14
R. S., *New York*	3
R. S., *Philadelphia*	2
R. S., *Boston*	2
Vessels of fleet	10
Other sources	10
?	4
Number on board—	
From 1 to 30 days	75
From 30 days to 6 months	25
From 6 to 12 months	8
From 1 to 2 years	3
Over 2 years	2
?	5

REPORT OF AN EPIDEMIC OF CEREBRO-SPINAL MENINGITIS AT THE UNITED STATES NAVAL TRAINING CAMP, SAN DIEGO, CAL.

By A. Farenholt, Medical Inspector, United States Navy.[1]

In July, 1917, an epidemic of cerebro-spinal meningitis occurred at the United States Naval Training Camp, San Diego, Cal., among recruits received from the naval training station at San Francisco. Sixteen cases occurred, one of which terminated fatally. The first case appeared June 10 (became ill on the train while enroute from San Francisco), the last on July 25, 1917. The patients were all treated at the municipal isolation hospital, an institution maintained by the board of health of the city of San Diego.

The complement of the station at the onset of the epidemic was approximately 1,600 men, who were quartered in large buildings originally erected to display exhibits during the Panama-California Exposition.

A study of the epidemiological conditions present at the camp during the first days of the epidemic revealed two factors which were of prime importance in the spread of the disease, namely, the presence of carriers of the meningococcus and some general insanitary conditions existing in the buildings used for quarters, which tended to lower the resistance of the recruits quartered in them. The means employed in eradicating the disease may, accordingly, be considered in two groups:

First. A bacteriological survey of the entire command for the purpose of isolating and treating the carriers of meningococci.

Second. The general sanitary measures applied to the camp.

The bacteriological survey was difficult, inasmuch as no laboratory facilities existed in the camp and because of the fact that laboratory appliances and material were exceedingly difficult to obtain on the Pacific coast. Fortunately, the board of health of the city of San Diego possessed a well-equipped laboratory, presided over by Dr. H. A. Thompson, the city bacteriologist, who enrolled as an assistant surgeon in the Naval Coast Defense Reserve, and, with Assistant Surgeons L. H. Clerf, P. W. Wilson, United States Navy, Passed Assistant Surgeon C. L. Williams, U. S. P. H. S., and Dr. F. L. Kelly of the California State Board of Health, began the survey. The bacteriological procedures were at first carried out in the city laboratory, but as it was soon realized that the station required an efficient laboratory for the performance of future work, two rooms were set apart in the surgical building for a station laboratory. Fixtures were installed and material and supplies purchased. Twenty-four days after the rooms were assigned for laboratory purposes they were completely equipped, and a portion of the work was being done there by Passed Assistant Surgeon Williams, U. S. P. H. S., and Dr. Kelly.

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[1] Written in collaboration with Passed Assistant Surgeon W. M. Kerr and Assistant Surgeon L. H. Clerf, United States Navy, and Assistant Surgeon H. A. Thompson, N. R. F. United States Navy.

The survey was conducted as follows: Groups of from 50 to 100 men were cultured, early in the work, every other day; later, when the working force became more efficient, daily. The material from the postnasal space for culture was taken by a laryngologist, Dr. R. J. Fly, of San Diego, whose dexterity undoubtedly prevented unnecessary contamination. The sterile swab holding this material was passed by him to the bacteriologist, who inoculated plates, as described below.

When the laryngologist had finished taking cultures all men in the group were given a spray of argyrol 2 per cent, both nares and the postnasal space being thoroughly sprayed. The group was then marched to quarters and kept separate from men who had not been cultured. At 3 o'clock in the afternoon this group was again marched to the sick quarters for nose and throat treatment, which was repeated at 10 a. m. the following morning. In this way all men cultured received three intensive throat treatments before the report from the laboratory arrived. When the report of the bacteriological findings in this group was received those men who had been demonstrated not to be meningococcus carriers were released from quarantine and granted liberty; those men who were found to have suspicious organisms (gram negative cocci) growing in their throats were isolated in a special detention camp until their cultures were run through sugar media, when they were found either to be free from infection or to be carriers. If free from infection they were liberated and granted liberty. If they were proven to be carriers of the meningococcus they were placed in another isolation camp, which was occupied only by true carriers. In both of these camps the men were given intensive throat treatment by means of the argyrol spray.

The spray treatment was given under the supervision of a medical officer, who was assisted by a squad of five men. The spraying apparatus was mounted on a small truck and consisted of a one-quarter horsepower electric motor and an air tank from which two tubes lead to spray bottles with metal tips, enabling two carriers to be sprayed at once. The spraying squad of five men was organized as follows:

Two men manipulated the spray, spraying the anterior nares; then, after depressing the tongue, the postnasal space. When the spraying was completed in each case the spray bottles were detached from the hose containing the compressed air and passed to two men, who passed the metal tip through the alcohol flame. The remaining, or fifth man, kept the record of the men sprayed. When this squad became efficient four carriers could be thoroughly sprayed by the two sprayers each minute. An average of 250 men were sprayed daily. Men isolated in the camp for true carriers were liberated after three negative cultures, taken one week apart, had been reported from the laboratory.

The same requirement applied to patients ill of meningitis at the municipal isolation hospital.

It was found that in the majority of the carriers the infection was of a temporary nature. In a small number of cases the infection was persistent and required weeks of intensive spray treatment to eradicate it.

Total number of men cultured	1,583
Total number of true carriers isolated	80
Percentage of true carriers	5.05

The details of the bacteriological work in the laboratory as described by Drs. Thompson and Clerf are as follows:

Step No. 1.—The material obtained from the nasopharynx of the patient to be examined is smeared immediately over the surface of freshly prepared sheep serum agar plates. Two plates are smeared for each case, the swab being smeared over the first and then the second plate, or the second plate may be smeared with a sterile bent rod from plate No. 1. Both methods were found to be satisfactory. This second plate may appear unnecessary, but in a certain number of single-plate smears the colonies are so numerous that a careful study of a single colony is impossible. In such cases the second plate usually shows discrete, well-separated colonies. Mark the plates inoculated with the serial number and bring to the laboratory at once and place in the incubator (37 C.).

Step No. 2.—Plates are examined in 24 hours and all suspicious colonies are examined microscopically. A small amount of the suspicious colony is then inoculated on an egg slant. Ascitic fluid agar was used for a time but, on account of the scarcity here of ascitic fluid, egg media was substituted with good results. Meningococci do not grow so readily or rapidly on egg media, but satisfactory results were obtained.

Step No. 3.—Plates are returned to incubator for 24 hours longer. After being cultured on egg slants for 24 hours at 37 C. the suspicious colonies are examined and if gram negative diplococci are still present inoculations are made on carbohydrate media.

Step No. 4.—Examine cultures on carbohydrate media for acid production and on egg media for type of growth.

In the examination for acid production four tubes, designated as A, B, C, and D, were used. These tubes contained ascitic fluid agar, to which 1 per cent of the fermentable sugar was added, together with 1 per cent of the Andrade indicator, with the reaction of the media set to this indicator. Tube A contained glucose, tube B maltose, tube C levulose, and tube D galactose. The Andrade indicator is to be preferred to the litmus solution, which was used for some time, as the reactions of the former are more plainly evident. Fermentation of maltose and glucose only is indicative of meningococci. Such cultures should be examined microscopically; if gram negative on sugar media, seal the egg media with paraffin and keep for further serological tests. The throat culture from such a case showing gram negative diplococci when the maltose and glucose cultures are examined microscopically is to be considered as positive, and the patient to be treated as a carrier. The plates of such a case can be imediately discarded. If in doubt, make subcultures on media stated above.

Step No. 5.—All petri dishes with discarded cultures are placed in a 10 per cent cresol solution for 1 hour, and then boiled for 5 minutes, transferred to a soap powder solution and boiled for 20 minutes, rinsed in water and then placed in battery fluid. (Potassium bichromate, 60 grams, dissolved in 300 mils of distilled water, then add 460 mils sulphuric acid; use this in the strength of 1 part of solution to 10 of water.) Remove at end of 2 hours, rinse very thoroughly, and then allow to drain until dry; wrap and sterilize in hot-air sterilizer (160 C. for one to one and one-half hours). This method was instituted following an overwhelming glassware contamination by the bacillus subtilis and has proven satisfactory.

Step No. 6.—All used slides are immersed in 5 per cent lysol solution for 24 hours, cleaned in tap water, and placed in 70 per cent alcohol, so as to be ready for further use.

DETAILS REGARDING THE MICROSCOPIC EXAMINATION OF SUSPECTED COLONIES.

Divide perfectly clean fat free slides in four to five equal proportions, place in the center of each space one drop of filtered water, emulsify therein a small amount of the suspected colony. The slide then is air-dried and fixed by passing through flame. Stain for one-half minute with carbol gentian violet (10 c. c. of saturated alcoholic solution of gentian violet to 100 c. c. of a 2 to 2½ aqueous carbolic acid solution). Wash off stain and apply Gram's solution for one-half minute; decolorize with 95 per cent alcohol, and counterstain with diluted carbol fuchsin 1 to 10 or diluted safranin. (A saturated solution of safranin is made in 95 per cent alcohol. This stock solution is diluted 1 part to 10 parts distilled water for counterstain, and can be stained for about one-half minute. This makes a very excellent counterstain, and appears to give sharper definition than dilute carbol fuchsin.) Every worker is advised to test his Gram solution and stain every morning by using staphylococci and a known strain of meningococci mixed on the same slide.

The culture medium used for primary isolation is sheep serum agar. This is prepared as follows:

(*a*) *Veal broth.*—Use ordinary veal (bob veal), trim off all tendon and fat, keeping only muscle tissue; grind, weigh, and mix with distilled water, using 1 gram of the veal to 2 mils of water. Keep this mixture in the ice box overnight (24 hours); then press out all liquid, using a piece of fine muslin; place in rice cooker and bring to a boil; strain through flannel and then add peptone (Fairchild), 1 per cent; sodium chlorid, ½ per cent; bring to a boil to dissolve these added ingredients; cool to 5 C. This throws down a fine precipitate, which is removed by filtering through double filter paper. Flask and sterilize in autoclave for 20 minutes at 20 pounds pressure.

(*b*) *Nutrient agar.*—To veal broth add powdered agar to make a 3 per cent agar solution; autoclave for 30 minutes to dissolve; titrate and correct to 0.4 plus phenolphthalein; cool to 45 C.; bring to volume by addition of distilled water; add the albumen of two eggs, and stir well; then place in compound filter; autoclave for 20 minutes at 20 pounds. Allow the autoclave to cool until a vacuum is created; then allow air to enter the autoclave through the stopcock, and leave filter in place until the media has entered the jars (about 15 minutes); remove flannel from necks of jars and strain through flannel; flask and sterilize 20 minutes at 20 pounds (third sterilization).

The compound filter used in the preparation of agar media consists of (*a*) a straight-side, flat-bottom receptacle (preferably agate ware), sufficiently large to accommodate three to four pint jars; (*b*) three or four wide-neck, straight-side jars (Mason pint fruit jars); (*c*) short glass rods, diameter ⅛ inch; (*d*) Canton flannel and string. To use, moisten the Canton flannel and place over the neck of the jar (using double thickness), and fasten firmly with string. Place glass rods in bottom of the receptacle. The jars are then placed neck downward on the glass rods in the bottom of the receptacle. If the jars are small, tilting may occur. This can be prevented by using a wooden reel or other simple contrivance to give support. Having assembled the filter, pour media into the receptacle and autoclave for 20 minutes at 20 pounds. During this sterilization a partial vacuum is produced in the jars. When the autoclave is cool an equal negative pressure exists in both autoclave and jars. Upon opening the stopcock, the pressure in the autoclave immediately becomes positive, and an automatic filtration takes place. It is important to have the glass rods placed under the jar necks to allow the entrance of the media. This method of filtration was not original here, but was found very satisfactory.

(*c*) *Sheep serum water.*—Prepare sheep serum water by mixing 1 part of perfectly clear, fresh sheep serum with 3 parts of distilled water. Sterilize in the autoclave for 40 minutes at 15 pounds pressure, or in the Arnold sterilizer for 30 minutes on three successive days. To obtain a clear serum, it is advisable to collect the blood in cylindrical jars or other suitable containers, and then place them in the cold-storage rooms for 24 hours before being transferred from the slaughterhouse to the laboratory, thus securing a clear, straw-colored fluid, instead of the heavy, blood-stained serum which is seen when blood is considerably agitated before clotting has set in. To make the sheep serum agar, the nutrient agar is melted and the sheep serum water is added (1 part of sheep serum water to 5 parts of nutrient agar). In this connection it is important that the agar be cooled to 48 or 50 C. before the sheep serum water is added, in order that a transparent media be obtained. If added to a hot agar, the resulting media is often quite turbid.

When ready to pour plates, melt the veal agar in the autoclave, cool to 48 C.; add sheep serum 1 part to 5 parts of veal agar and dextrose 1 per cent. The dextrose may be kept in a sterile 25 per cent solution. Then pour plates. It is always well to incubate plates overnight before using. In this way all contaminated plates can be detected and discarded.

Ascitic fluid agar.—Ascitic fluid agar is prepared by adding to 3 parts of melted and cooled 3 per cent veal agar 1 part of warm ascitic fluid. Melted agar is tubed by means of sterile funnel or sterile burettes and immediately slanted. Avoid the formation of air bubbles.

Ascitic fluid agar with Andrade indicator is made as follows: Prepare ascitic fluid agar as described above. To 135 c. c. of this melted agar (100 c. c. of veal agar plus 35 c. c. of ascitic fluid) add 1.5 grams of glucose, levulose, maltose, or galactose, respectively, and 1 per cent of the Andrade indicator. This mixture is gently shaken, and by sterile funnels tubed in small test tubes and slanted properly.

Andrade indicator.—Acid fuchsin, 1 gram; distilled water, 100 c. c. N/1 sodium hydroxide, 16 c. c. (stock solution). Use 1 per cent of this solution.

Egg media.—Wash 10 to 20 eggs with soap and water. Flame end of egg, break the shell, and stir the yolk and white of the eggs very thoroughly. Strain through cheesecloth and distribute by means of sterile funnels into small test tubes. Heat slowly to 70 C. to expel the air. Solidify at a temperature of 75; sterilize on three successive days in Arnold sterilizer at a temperature of 90 to 100 C.

NOTE.—Test the above media with known meningococci strains.

THE MORPHOLOGICAL CHARACTERS OF THE MENINGOCOCCUS.

On the sheep serum agar the meningococci appear as small, discrete, whitish colonies, which, with direct light, show a fairly uniform haziness throughout. With reflected light, the surface is shiny and assumes a "mother-of-pearl" appearance. On egg media it varies from a very light lemon yellow tint to a distinct yellow color. Confusing organisms most commonly found are the *Micrococcus flavus*, *Micrococcus catarrhalis*, and the *Micrococcus pharyngis siccus*. The latter organism often gives irregular reactions on carbohydrate media as well as in its agglutinative properties, and causes considerable confusion, but its growth on egg media is quite characteristic, being of a grayish yellow or yellowish color, the surface dry and somewhat irregular, and the colonies firmly adherent to the media.

The macroscopic slide agglutination method described by Krumwiede was used for a short time, but the results were not satisfactory, so that complete reliance was placed on the fermentable reactions of gram negative diplococci on carbohydrate media. With this method the percentage of positive carriers might probably have been slightly increased, but it provided for the isolation of all questionable cases. A suitable agglutinating serum was not available in the early part of the work, but in the future it is hoped that all cases can be checked up in this manner.

The general sanitary measures applied to the camp were as follows:

Ventilation of the exposition buildings.—These buildings are large structures, designed primarily for the shelter of exhibits of various character. Their ventilation depended on currents of air entering through doorways and small ornamental windows placed generally midway between the floor and the roof. The heated air from the lower regions of the building ascended to leave through rows of ventilators in the sides of skylights on the roof. These ventilators were partly closed by wooden slats designed to prevent the entrance of rain.

With this arrangement of the openings for ventilation, large volumes of stagnant air collected in various portions of the buildings. To remedy this defect a series of ventilating holes 5 by 2 feet were cut in the walls of each building, 2 feet above the floor, and the wooden slats in every other ventilator in the roof were removed. With these alterations the ventilation of the buildings became satisfactory.

Exclusion of new infection from outside.—A recommendation was made to the Bureau of Navigation that no recruits be sent to this camp from other training stations until it was reported that the camp was free from infection, the epidemic having subsided, and the carriers among the present complement having been determined and isolated. The bureau approved this recommendation and no new drafts were received.

In the meantime a detention camp having a capacity of 480 men and capable of some expansion was constructed for the reception of all newcomers. In this camp provision was made for the complete isolation of the inmates in groups of 30.

Prevention of the spread of the disease to the city of San Diego.—As soon as it was realized that the occurrence of meningitis in the camp was assuming epidemic proportions, liberty for all men under instruction was stopped. With the exception of the chief petty officers and a few of the older petty officers living with their families in San Diego, no man was granted liberty until a culture taken from his postnasal space demonstrated him to be free from meningococci. Furthermore, *the camp was closed to all visitors from the city.*

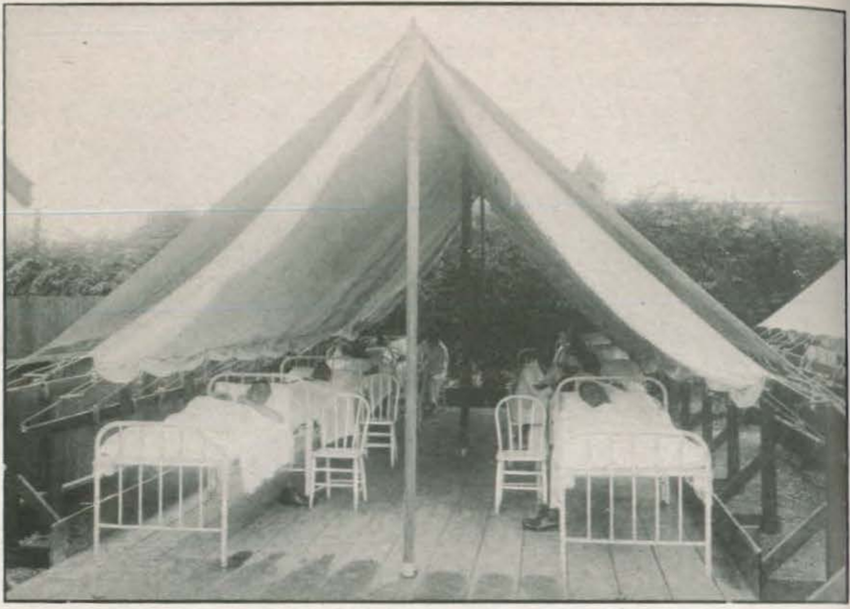
The evacuation of infected buildings.—The majority of cases came from one large building used as a detention barracks for men lately arrived on the station, and from a balcony in the Southern California Building used as a ward by the medical department. As the weather conditions in San Diego during the greater portion of the year are ideal for outdoor sleeping, the men quartered in the detention barracks were moved out on a large lawn, where they slept on cots in the open air. They were kept in detention until proven free from infection. The sick in the ward on the balcony were isolated in tents and were not returned to duty until a culture from the postnasal space negative for meningocicci demonstrated them free from infection.

Segregation of the personnel in small groups.—As far as was practicable the men attached to the camp were segregated into groups of 200 ór 250. These groups did not mingle so far as it was possible to prevent it. Each group was quartered, drilled, bathed, and messed separately from the other groups. A talk was given to each group concerning the epidemic, and the men were cautioned against close contact.

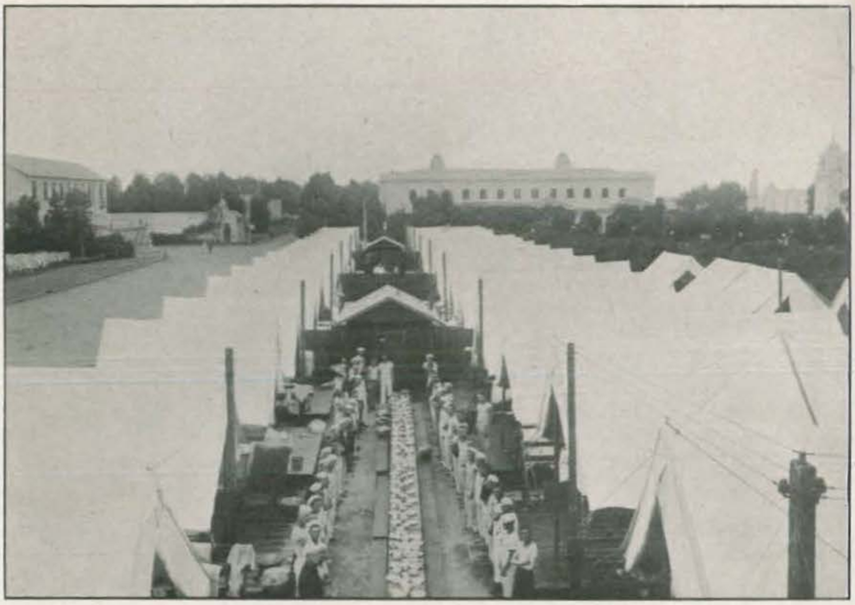
Disinfection by sunlight.—As the meningococcus has little resistance, advantage was taken of the abundance of sunlight prevalent in San Diego. Large frames were constructed, upon which the bedding was placed daily and allowed to remain flooded with sunlight until late afternoon. The mess tables, which at first were set up in a large building used during the fair as a restaurant, were moved out into a broad street, where they were exposed, with the mess gear face up, to the direct rays of the sun throughout the day. The men were kept out of doors as much as possible, with the result that the entire command soon assumed the tanned aspect of sailors who had cruised long on tropical seas.

DESCRIPTION OF THE ISOLATION CAMP.

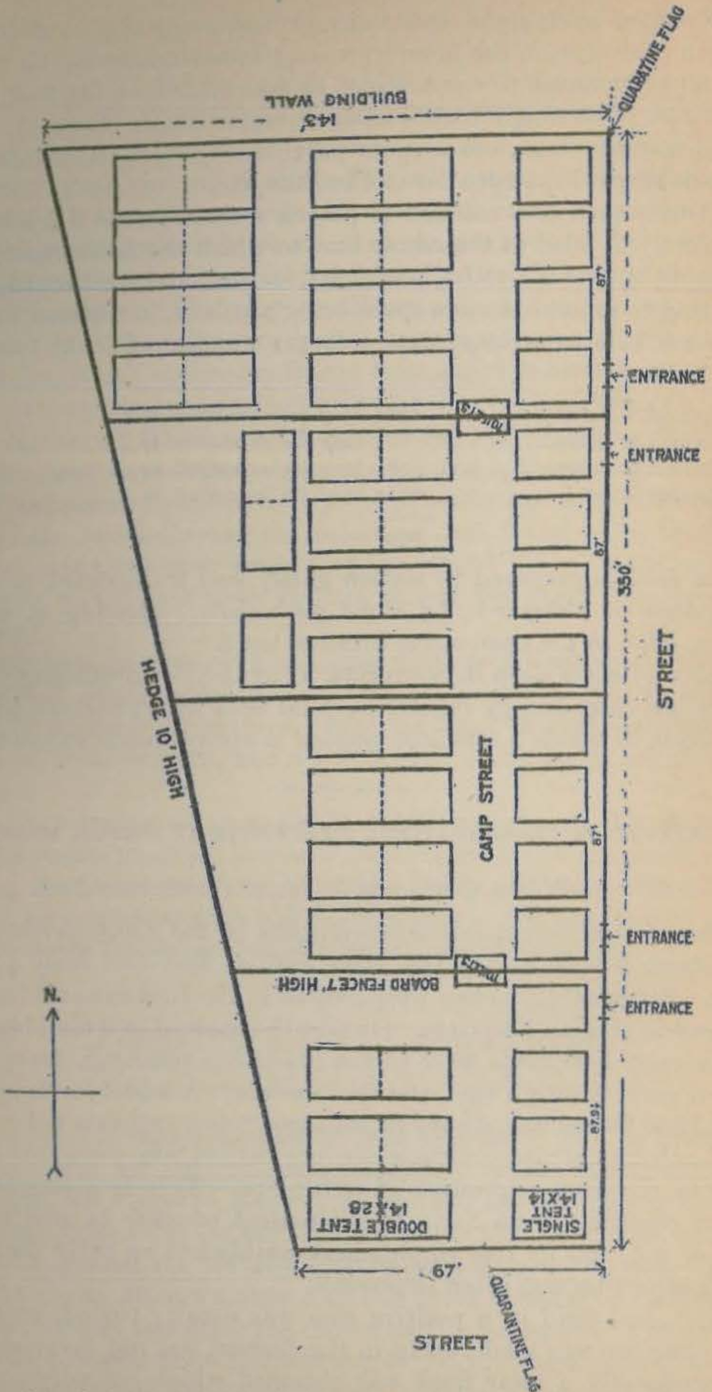
The ground available and used for this purpose is a somewhat irregular rectangle, 350 feet in length, 67 feet in breadth at one end and 143 feet at the other. This space is divided into four sections by board fences 8 feet high; a high wire fence surrounds the camp.



VIEW OF TENT USED FOR BED CASES, ONE SUCH FOR EACH PADDOCK. OTHERS. SLEEP IN "GOLD MEDAL" COTS, USING THEIR OWN MATTRESSES AND BEDDING.



VIEW OF CAMP STREET.



Ground-plan of isolation camp showing division into four sections.

Each section holds eight tents 14 by 14 feet, hospital size, placed two to each platform on the lower row, and four tents 14 by 14 feet on the upper or street row. A street 12 feet wide runs between these two rows. One single tent is used as an entrance, Hospital Corps, and dispensary tent, and a space capable of holding a double platform in rear is kept open for clotheslines, etc.

Between each two sections is placed a small house 9 by 10 feet completely divided in the center line, to which the fence comes. On each side of this is a toilet, washbowl, shower, and washboard.

Owing to somewhat more space being available in sections 3 and 4, these are able to accommodate a larger number of tents (see plan attached).

Section 1 holds	54; may be expanded to	88
Section 2 holds	66; may be expanded to	88
Section 3 holds	84; may be expanded to	112
Section 4 holds	114; may be expanded to	152
	318	440

The food is prepared in station galley and transported to camp, a distance of 150 yards, by three push carts. Messing is, at this season, done in the open street between tents.

Ordinary cases sleep in camp cots, using their own bedding. More severe bed cases occupy regular hospital beds with mattress, pillows, and linen, of which a sufficient number is always held available.

REPORT ON CEREBRO-SPINAL MENINGITIS AT BOSTON, MASS.

By L. W. McGuire, Passed Assistant Surgeon, United States Navy.

Nine cases of cerebro-spinal meningitis in the Navy developed in and about Boston during the latter part of May and early part of June. Seven of these cases were treated in the Boston naval hospital and two in civilian hospitals. One death occurred in a civil hospital.

The early symptoms were severe headache, vomiting, fever, stiffness of neck, Kernig's sign, and leucocytosis. A leucocytosis varying from 12 to 28,000 was always present and was a valuable aid.

A lumbar puncture was made in every patient who presented symptoms in any way suggestive of meningitis. This is a simple procedure resulting in no harm to the patient whether he had meningitis or not, and its free employment established an early diagnosis which otherwise was often impossible.

The spinal fluid in a positive case was usually turbid, when the first puncture was made, early in the disease, but not invariably so, as occasionally a clear fluid was obtained which on microscopical examination was positive. The spinal fluid always became turbid as the disease progressed.

On obtaining a cloudy spinal fluid the specific serum was immediately injected. If the general symptoms were marked the serum was injected even if the spinal fluid was clear. In all but one patient the meningococcus was found. The cell count of the spinal fluid was usually from 7 to 19,000. A daily cell count was found to be an excellent check on the progress of the disease and the treatment. A rapid fall in the count takes place after the first injection of the specific serum and the drop continues each day, serum usually becoming clear after the fourth day, with abatement of the general symptoms, which indicate sufficient treatment has been received.

The treatment consisted of injecting 15 c. c. of Flexner's serum after recovering 20–30 c. c. of spinal fluid and repeating this every day for four days, which is ample for the average case. In very severe infections two injections were given in one day. Raising the foot of the bed following the injections was found to be beneficial. Several injections were made into the lateral ventricles in one case in which spinal injections did not relieve the symptoms; recovery followed.

Complications were not numerous; the most serious was deafness—one case of complete deafness in both ears, and one deaf in one ear, which is probably permanent. One man had an acute arthritis left wrist, an acute orchitis, and a pericardial friction rub, all of which subsided.

The importance of an early diagnosis was clearly demonstrated, and the results obtained in this hospital were due to a large extent to getting these cases early, establishing a diagnosis, and immediately beginning treatment with the specific serum. In any case of suspicion or doubt immediate lumbar puncture is imperative.

A COURSE FOR STUDENT MEDICAL OFFICERS.

By R. B. Greenough, Surgeon. United States Naval Reserve Force.

It is possible that a number of medical officers may be interested in the course for student medical officers, which was arranged in Boston at the Harvard Medical School and the Boston hospitals in June and July, 1917, for the training of the 1917 graduates in medicine who entered the Naval Coast Defense Reserve, class 4. There were 24 junior officers assigned to the naval hospital in Chelsea for this instruction, and after the course had been planned 11 more were detailed to Boston from Portsmouth, N. H., making a class of 35.

The instruction was based largely upon the course given in the Naval Medical School in Washington, but with certain modifications designed to make up, so far as possible, for the lack of hospital experience on the part of these officers, who left the medical school before the close of their fourth year.

The general arrangement of the course was as follows: Early morning hours were given up to section and laboratory work. At 12 o'clock a clinical lecture was given at one or another of the hospitals. In the afternoon an hour was devoted to drill, and there was a lecture or demonstration at the naval hospital on naval administration and organization and military medicine.

The subjects studied and the instructors were as follows:

Bacteriology.—Laboratory course, mornings, for two weeks.

Exercises were given in the identification and culture of pathogenic organisms, the preparation and standardization of vaccines, dark-field illumination, throat cultures, agglutination, etc.

Professor, H. C. Ernst, Harvard Medical School.

Parasitology and tropical medicine.—Laboratory work, mornings, for two weeks.

The diagnosis and treatment of malaria, amebic and bacillary dysentery, yellow fever, beriberi, and other tropical diseases were taught, together with more important animal parasites.

Professor, E. E. Tyzzer; Assistant Professor, A. W. Sellards.

Preventive medicine and hygiene.—Laboratory course, all day, for two weeks.

This was considered to be a very important part of the training, and an abundance of time was given for these exercises. Subjects included in this course were: Water supply, food poisoning, ventilation, specific prophylaxis of diseases, vaccines, antitoxins, quarantine, prevention of diphtheria, pneumonia, meningitis, plague, typhus, typhoid, etc., camp sanitation, sewage and garbage disposal, venereal prophylaxis, vaccination, sanitary water analysis, examination of food for adulterants, milk analysis, sanitary analysis of air, carbolic coefficient tests.

Professor, M. J. Rosenau.

Examination and diseases of the blood.—Laboratory work, in sections, mornings of one week.

An opportunity was given for making the more important examinations in the blood diseases.

Assistant Professor, Francis Peabody.

X-rays.—Practical work, in sections, at the different Boston hospitals, mornings of one week for each student.

This included the general technic of taking and developing plates as well as their interpretation.

Instructor, G. W. Holmes, and assistants.

Clinics and clinical lectures were given at the Massachusetts General Hospital and at other hospitals in Boston on the following subjects:

Legal medicine.—Two exercises, medicolegal post-mortem examinations.

Dr. G. B. McGrath, medical examiner of Suffolk County.

General medicine.—Twelve clinical lectures.

The subjects included in these clinical lectures were as follows: Typhoid, paratyphoid, acute rheumatic fever, endocarditis, pericarditis, acute and chronic nephritis, headache, constipation, aortitis, pleurisy, failure of compensation, pneumonia, bronchitis, early tuberculosis, diabetes, hyperacidity, gastric and duodenal ulcer.

Professor, H. A. Christian, Instructors, W. H. Smith, Drs. J. B. Hawes, 2d, and F. G. Brigham.

Three clinical exercises were also given to the class in sections at the contagious department of the Boston City Hospital on diphtheria, septic sore throat, scarlet fever, measles, cerebro-spinal fever, infantile paralysis, and mumps.

Assistant Professor E. H. Place.

Surgery.—Six clinical lectures.

The exercises included: Gunshot wounds, infected wounds, tetanus, gas-bacillus infections, Carrel treatment, fractures, hernia, acute abdominal emergencies, cranial surgery, anæsthesia, shock, hemorrhage, and transfusion.

Two special lectures were given on genito-urinary surgery, including gonorrhea, chancroid, and bubo.

Three lectures were given on tuberculosis of joints, chronic arthritis, and the prevention of joint complications, especially in relation to military surgery.

Assistant Professor R. B. Greenough, Assistant Professor C. L. Scudder, Professor C. A. Porter, Dr. D. F. Jones, Dr. G. G. Smith, Dr. Mark Rogers, Dr. Lyman Hapgood, and Dr. Horace Stevens.

Professor C. L. Gibson, of the New York Hospital, also gave a lecture, while on a visit to Boston, upon the Carrel treatment of war wounds, based upon his own experiences in France and Belgium.

Syphilis.—Three clinical demonstrations were given covering the early and late manifestations of syphilis, its treatment, and the value of the Wassermann reaction.

Assistant Professor C. M. Smith.

Dermatology.—Three clinical demonstrations were given on the more important skin diseases—parisitic and inflammatory.

Instructor, F. E. Burns.

Psychology.—Four clinical lectures were given at the Boston Psychopathic Hospital, on the forms of mental disease likely to be encountered in military practice.

Professor, E. E. Southard.

Ophthalmology, nose and throat, otology.—Four exercises in ophthalmology, two in diseases of the nose and throat, and two in otology were given by Passed Assistant Surgeon D. J. Heffernan, U. S. N. R. F., at the naval hospital in Chelsea.

Naval military medicine.—Six lectures.

These lectures included the organization and duties of the Medical Department—Records, supplies and equipment, recruiting, landing parties, camp sanitation, and personal hygiene; Hospital Corps—Drill and organization, sea service, inspection, sick call, ventilation, food inspection, battle quarters, hospital ships, and quarantine.

Surgeon J. M. Brister, U. S. N., Naval Hospital, Chelsea.

The services of all of the civil instructors in this course were given gratuitously and at some inconvenience. The facilities of the Harvard Medical School and of the hospitals in Boston were also volunteered for the purposes of the course, and the actual cost for the preparation of supplies and for the supplies consumed, amounting to about $250, was paid by the State of Massachusetts, on recommendation of the committee of public safety. To all of these volunteer participants the Navy is indebted for their generous and patriotic service.

EXTERMINATION OF MOSQUITOES AT THE NAVAL PROVING GROUND.

By F. P. W. Hough, Passed Assistant Surgeon, United States Navy.

The location of the naval proving ground and smokeless powder factory is such that the station has always had a bad reputation for mosquitoes, and each year malaria has been responsible for a heavy loss to the Government both in actual time lost by sick employees and the unsatisfactory work done by men suffering with anemia and other sequelae of malaria yet continuing at their work. Many of these men were of course infected in their homes in the surrounding country, but a large percentage were undoubtedly bitten by infected mosquitoes on the station, especially while working the night shifts.

Mosquitoes have been so numerous in previous years that it was a very easy matter to obtain large numbers of eggs, larvae, and pupae from any pool when the writer arrived here one year ago, and about 10 per cent of these would be Anopheles.

Oil had been used regularly, and all Navy quarters and offices were well screened. The first, while theoretically good, was not practical, for this is swamp land, and the oil was excluded from parts of the surface of many of the pools by pieces of twigs, grass, etc., and these bare spots would furnish good breeding places. It was also next to impossible to reach many of the pools and properly treat them on account of the heavy undergrowth. Other points entering into the difficulty evidently were the lack of interest and ignorance on the part of the laborers assigned to this work, and the number of pools scattered over a large area, necessitating long walks on hot days, when it was far more comfortable for the laborer to rest in some cool spot and allow the mosquitoes to continue their breeding unmolested. Screens supplied in this latitude are of such coarse mesh that mosquitoes have no difficulty in negotiating them, and from personal knowledge it was impossible at this time last year, or to be correct three weeks later, to obtain a comfortable night's sleep, owing to the swarms of the pests in sleeping quarters.

During a previous tour of duty here (1908) certain experiments were made along the lines of mosquito control, and the insects were fairly well eliminated from the station, but no definite results were recorded and no reliable data could be submitted. This year a campaign was started in the early spring, and all work has been carefully supervised with reliable results.

The insecticide used is a by-product in the manufacture of powder, ordinarily valueless and washed into the creek as it accumulates. It is commonly known as "nitre cake," but is really sodium acid sulphate, with impurities, and containing about 30 per cent free acid. When this solid, partly granular, substance is placed in water it dissolves slowly, and it has been found that when mosquito eggs are deposited in water containing as low as 10 per cent by volume of the sulphate the eggs will hatch, but the larvae nearly all die, and it is rare that any reach the pupal stage. A much stronger solution is of course desirable and pools have been well loaded here, so that rains have not lowered the strength of the solution appreciably, and as the water evaporates some of the sulphate is deposited on the edges of the pool to be later redissolved when more water accumulates. It has of course been necessary to eliminate all stagnant water where this was possible, but there are many parts of the station where this is not practicable.

Grass and weeds are killed around the pools by the action of the acid, and this is really an advantage on land of this character, though it would prevent the use of this substance in many places, such as rice fields, irrigation ditches, and ornamental lakes.

It has the advantage, however, of being a waste product here; therefore the total cost of the campaign has been the pay of one common laborer assigned to the work and the supervision of the medical officer. The laborer is instructed to put a quantity of the "cake" in every pool or stagnant body of water he finds about equal to one-third of its contents, and he revisits each place treated about once in three weeks. The hearty cooperation of the men employed in civil engineering work here in locating many of the pools and reporting to the medical officer has been a great aid. The employees and other persons residing in the surrounding country have also cooperated in the fight and have rid many places of tin cans, etc., in an effort to stamp out malaria.

All persons questioned and as many more who have made voluntary statements agree that mosquitoes have been controlled and almost eliminated from this reservation. The number of cases of malaria has correspondingly decreased, and no new cases have been treated this year. It is possible to sit on the lawns in the evening without the discomfort of these pests, and a mosquito inside a house is almost a curiosity.

SANITARY REPORT ON VLADIVOSTOK, SIBERIA.

By C. B. CAMERER, Passed Assistant Surgeon, United States Navy.

The following notes were taken while the U. S. S. *Buffalo* was awaiting the return of the American commission from Petrograd.

Population.—Estimated at 97,504 (census of 1910), and divided as follows:

Russians and other whites	62,504
Chinese	25,000
Japanese	5,000
Coreans	5,000
Total	97,504

Those of the Jewish race, heretofore barred from the city, are now permitted to reside therein.

Prevailing diseases.—The port at time of visit, June, 1917, was quite healthy. Epidemics are stated to be rare. Prevailing diseases at this time were scarlet fever, pneumonia, pulmonary tuberculosis, and a surprisingly small amount of typhoid fever. Vaccination against variola is compulsory.

Prostitution.—Very prevalent, and venereal diseases, especially gonorrhea, excessively so. Police surveillance, such as it is at present, is most lax and inefficient. Prostitutes are not segregated but are scattered throughout the city, nearly all hotels and rooming houses being infested with them.

Water Supply.—No municipal water system is installed. All potable water is derived from a small river about 1½ miles distant, and from wells sunk in the bed thereof or throughout the city proper. Water from the former is conveyed to the town in barrels and tanks for distribution to the consumer. The railroad has its own pumping plant at the river and has water for the use of shops piped therefrom. The naval port likewise has its own independent system, the supply being derived from wells, pumped into a reservoir, and then distributed through mains throughout the reservation.

Disposal of refuse.—There is no municipal sewerage system, although one was projected but work thereon was held up at the outbreak of the war. There are one or two private sewers in operation emptying either directly into the harbor or into a number of cesspools, the contents of the latter ultimately finding its way either to "truck" gardens or into the harbor, as above.

The naval port has its own sewerage system, also discharging into the bay.

The health department, or, more properly speaking, the medical department of the commission, now representing what may be termed the Government, supervises the disposal of garbage and other refuse, same being either collected and incinerated or carried away in tanks by Chinese coolies and dumped into the bay.

With few exceptions, earth or vault closets are in general use; no night soil was observed. Drainage of the city, wholly by natural means, is excellent, it being laid out upon a steeply sloping hillside, the soil being but thinly spread over the underlying rock, which frequently crops out.

Closets of the poorer classes are stated to be very filthy, but typhoid and the dysenteries are surprisingly infrequent.

Climate.—The climate is not very good, temperatures ranging as low as −20 F. in winter and from 60 to 90 F. in summer. The bays are frozen over for about six weeks during the months of December and January. The winters are usually very dry, with slight snowfall. No rain falls from November until March. Winters are characterized by very high, cold winds. Fogs are very prevalent during the months of May and June. The summer rains are moderate in precipitation. The best months of the year are August, September, and October.

Hospitals.—Hospital facilities at the time of visit were inadequate, due, in major part, to the great influx of people since the beginning of the war, and as a result the local institutions are taxed to full capacity. Those in operation are the naval hospital, situated in the naval port; the municipal hospital, partly completed and in excellent condition; four military hospitals or lazarettos, necessary for the 62,000 soldiers in and about the city; and a private hospital owned and operated by a Dr. Blumenfeldt, a very capable surgeon.

The following hospitals were visited:

Naval hospital.—This is situated in the naval port and consists of a group of four buildings, viz:

1. Main and administration.
2. Pharmacy and storerooms.
3. Venereal wards.

4. Contagious wards.

The buildings are well built of brick and stone with vitreous tile flooring. The ventilation in the main building is quite poor; a ventilating system was to have been installed, but work thereon was discontinued upon the outbreak of the war. All buildings of the group are steam heated.

This hospital has a capacity of 250 beds, located in four main wards. The operating rooms, toilets, and wards are all dirty and poorly kept. Many patients were observed in bed fully attired, boots and all. This hospital has its own sewerage system. The operating rooms are poorly lighted and drained. Instruments and appliances appeared plentiful, but show neglect. There were 240 inmates at time of visit, throat diseases, gastrointestinal disorders, and appendicitis prevailing.

The laboratory facilities were very poor both as to apparatus and condition, which may be accounted for in part by the departure of the entire laboratory force for active service some time since.

Sterilizing facilities consist of autoclaves, etc., in fair condition only. All hospital supplies seemed to be ample in quantity, but some, such as cotton, etc., rather doubtful as to quality. The library was very good for its size and well supplied with current foreign journals. The laundry connected with the hospital is in fair condition, but bathing facilities are poor. Food supply is ample and of good quality.

Entire equipment is generally in a poor and neglected condition. Among the different articles of equipment, static machines, Mueller tubes (water cooled), vibrators, bath cabinets, Finsen light cabinets, diagnostic lamps, etc., were observed.

Women (wives and dependents of officers and men) are cared for in separate wards. There were several obstetrical cases in the building at time of visit.

The general equipment of this hospital can not be rated as good, according to our standards.

Nursing is performed by both male and female attendants. There were three medical officers on duty at the time of my visit.

Venereal prophylaxis is not compulsory, nothwithstanding the high rate of damage to personnel, due to venereal disease; but all are advised to take the treatment as required, provision being made for its administration at all times.

Municipal Hospital.—This hospital is well located on high ground and is admirably constructed throughout. There are six large wards and many quiet rooms. All working people who pay 1 ruble a year are admitted. Others pay at the rate of 1 ruble a day, which is not enough to cover expenses, and the remaining cost is defrayed by the municipality. The hospital is well equipped and administered. The buildings are of brick and stone and are all fireproof. All wards are very clean and well appointed, and their equipment is excellent. Special clinics for eye, ear, nose, and throat cases, also for obstetrical, gynecological, and dental cases; all operating rooms are well lighted and ventilated.

This hospital has two large operating rooms, one each for "clean" and "dirty" surgical cases. Both of these are in excellent condition as to appointments, instruments, sterilizers, lights, etc. Patients are conveyed to the operating rooms by wheeled litters. The receiving wards are in a separate building, where the incoming patients are bathed, diagnosed, and subsequently forwarded to the proper departments. The laboratory of this hospital is very good, typhoid and other vaccines being manufactured. No Wassermanns are made at present. Case records are very carefully kept. All wards are well lighted and ventilated, and are excellently furnished. Diet kitchens, toilets, etc., were in good condition. Electric elevators are installed.

These buildings were first occupied in 1912 and belong to a series of 10 similar structures planned. The hospital maintains its own ambulance service and has several house physicians in attendance, also 8 to 10 internes. Its normal capacity is 250 patients, but it is said to be always overcrowded, there being over 300 at time of visit.

All venereal cases are kept in a separate building. Pharmacy and storerooms are in the receiving building. Stores and food were ample, the latter excellent. Cotton is poor (from Japan). Contagious diseases are well isolated. There were many cases of pneumonia at time of visit. Due to overcrowding, a large number of patients were cared for in the halls and corridors. The buildings are steam heated, electrically lighted, and well ventilated throughout.

Quarantine and pratique.—There are no quarantine regulations for naval vessels, unless they report the presence of contagious diseases on board, when the use of the naval hospital is permitted. Incoming merchant vessels are inspected by the port health authorities and pratique granted by them via the customs house. There is no apparatus installed for the disinfection or fumigation of vessels, and rat guards, etc., are not required for merchant vessels at the docks. Bills of health for outgoing steamers are obtained from the consuls and viséed at the customs house. This latter step is not necessary for men-of-war.

Prisons.—There is one large municipal prison and a police station. They are reported to be in fair sanitary condition. The former has a small infirmary with a capacity of about 20 beds. Vermin are very prevalent in the prisons, as well as plentiful throughout the town, fleas, lice, and bedbugs flourishing in great numbers. Mosquitoes are rare, but flies are very common, and buildings are very poorly screened, if at all.

Hotels and eating places.—The former are fairly comfortable but are practically without exception infested with vermin. Linen, etc., is fairly clean and ample in quantity. Restaurants are of several varieties and are all licensed. All the better class ones are clean, and food is served in a most appetizing and attractive manner. The food supply is ample at present, but prices are higher than normal, and some articles are scarce. Markets and provision stores are well stocked. Salad and other garden vegetables must be either cooked or rejected, due to the practice of Chinese gardeners of using night soil for fertilizer.

Medical attention and medicines.—Inasmuch as so many physicians have been sent to the Army, medical attention is very mediocre at present. The supply of drugs and surgical stores is ample here but is scarce in the interior.

Disposal of the dead.—Almost exclusively by burial. No crematory is in operation. Laws relative to the interment of infected cadavers are very stringent and are rigidly enforced.

REPORT OF RESEARCH ON PNEUMOCOCCUS.[1]

By S. KENNISON, Assistant Surgeon, United States Navy.

Fraenkel's pneumococcus causes the clinical disease of lobar pneumonia. It is a lancet-shaped diplococcus presenting a capsule upon proper staining; has no spores and is Gram positive.

There are many types of organism; the morphology of each type is identical with that of the next, staining characteristics are similar, and there is no positive method of differentiation except that of agglutination.

All types of pneumococcus are bile soluble—that is, a cloudy bouillon culture of pneumococci is readily cleared when added to ox bile because of the dissolution of the organism by the bile. They all acidify and coagulate litmus milk and ferment inulin with the production of acid. Any organism which is bile insoluble is not a pneumococcus.

The types have been divided into four groups; the first three are differentiated by agglutination tests. Type IV is not a definite type, but is a group containing all those strains of organism not agglutinated by type sera I, II, and III. This group contains a limitless number of strains.

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[1] Work done in conjunction with Dr. H. S. Bernstein of Rhode Island State Board of Health.

It has wrongly been stated that Type III consists of the streptococcus mucosus, for this organism is not bile soluble. Type III is a true and distinct strain of Fraenkel's coccus.

Types I and II cause 60 per cent of all cases of pneumonia; Type III causes about 25 per cent; Type IV about 15 per cent; but these ratios vary yearly and seasonally and with different localities.

Types I and II have an average mortality of 25 to 40 per cent. Type III has a mortality of 60 to 70 per cent, varying with the virulence of the organism. This is the most fatal form of the organism. Type IV ordinarily has a virulence of mild grade and a usual mortality of 5 to 10 per cent. It is exemplified by a very mild disease usually.

It has been found that most cases at the Newport naval hospital during this spring have been of Type IV and the virulence has been very great. The reason for this is still to be determined. Whether the usual forms which are saprophytic ordinarily become virulent when the person is under low resistance or whether the organism of one person's throat inoculates the air passages of a second person by means of droplet infection and gains a new virulence on fertile soil has not yet been established.

Agglutination tests are done with serum taken from a horse after fractional inoculation with living organisms; the sputum having been first injected into the peritoneal cavity of the mouse, an emulsion of the peritoneal fluid, after 24 hours, is tested against the horse sera. There are specific sera for the first three types and the fourth type is determined by process of elimination.

Treatment.—Horse serum immunized to the organism is used in Type I infection. It is the only serum which has been of therapeutic value, having reduced mortality from 25 to 6 per cent. There is no Type III serum yet on the market nor is there serum for Type IV infection.

SUMMARY.

1. These are four types of Fraenkel's Pneumococcus. Type IV is low mortality and usually needs no treatment in particular.
2. Type III is the most fatal form.
3. Types I and II have an average mortality of 25 to 40 per cent.
4. Only Type I has been treated successfully with serum.
5. Differentiation of types by agglutination tests.
6. The curative agent in Type I is a serum, not a vaccine.
7. Type IV has been the prevalent infection at this institution and has been unusually virulent and fatal.
8. Is there a particular strain in Group IV which has caused this or was it due to the saprophytic forms becoming unusually virulent in the presence of low resistance?

REPORT ON MANUFACTURE OF SALVARSAN.

By the FEDERAL TRADE COMMISSION, November 27, 1917.

The Federal Trade Commission to-day entered orders for licenses to three firms to manufacture and sell the product heretofore known under the trade names of "Salvarsan," "606," "Arsenobenzol," "Arsaminol," patent rights to which have been held by German subjects. The orders for licenses are subject to acceptance and agreement by the licensees to the stipulations made by the Commission. Upon such acceptance and agreement licenses Nos. 1, 2, and 3 will be formally granted by Secretary L. L. Bracken, acting for the Commission.

Hereafter this important drug will be manufactured and sold under the name of "ARSPHENAMINE."

The Trade Commission's action was taken under section 10 of the trading with the enemy act, under direction of Commissioner Fort, upon recommendation of C. H. McDonald, Edward S. Rogers, and Francis Phelps, in charge of granting such licenses. The Public Health Service has prepared rules and standards for the manufacture and testing of "ARSPHENAMINE" and will supervise its manufacture, authority having been conferred on the Public Health Service by the Secretary of the Treasury, and the observance of the rules and standards become a condition of the license.

The three firms which will be hereby permitted to manufacture and sell "Arsphenamine" are Dermatological Research Laboratories, of Philadelphia; Takamine Laboratory (Inc.), of New York; and Farbwerke Hoechst Co. (Herman A. Metz Laboratory), of New York. The original patent for manufacture of what has heretofore been known as "Salvarsan," etc., was issued to Paul Ehrlich and Alfred Bertheim, German subjects, and assigned to Farbwerke Vormals Meister, Lucius and Bruning, of Hoechst on the Main, Germany.

Before the war began, the patented drug was sold at $4 per dose, which is approximately $3,500 per pound, and speculatively it has brought as high as $35 per dose. While the price of the product is not fixed at this time by the Commission, the right to fix prices is retained, and a price of $1 per dose to the Army and Navy, $1.25 per dose for hospitals, and $1.50 per dose for physicians are the prices at which some, at least, of the licensees have stated that they intend to offer the licensed drug.

The enormous shortage of supply of this important product will immediately be relieved and the article placed in the hands of the Government, the hospitals, and the medical profession at a price lower than ever before.

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, double spacing and wide margin are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterhead, numbered paragraphs, and needless spacing between paragraphs, all of which requires correction before going to press. The Bulletin endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews. For example, an article by P. A. Surg. G. Alen, U. S. N., on Removal of the Gasserian Ganglion, should be headed as follows:

Removal of the Gasserian Ganglion.

By G. Alen, Passed Assistant Surgeon, United States Navy.

If a review is submitted of an article by J E. Thompson, M. B., B. S. (Lond.), F. R. C. S. (Eng.), F. A. C. S., Galveston, Tex., Professor of Surgery, University of Texas, entitled "A Study of Modern Operations in Hypospadias from an Anatomical and Functional Standpoint," appearing in Surgery, Gynecology, and Obstetrics, Volume XXV, No. 4, October, 1917, the following heading would conform to the usage of the Bulletin in recent years:

Thompson, J. E. Modern Operations for Hypospadias. Surg., Gynec., and Obst. October, 1917.

The author's initials are important, not so his titles. If the reviewer is not familiar with the exact abbreviation employed by the Index-Catalogue of the Surgeon General's Library and the style adopted by the American Medical Association Press, it is best to write the name of the periodical in full.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

Only the names of actual reviewers for a current number appear.

The Bulletin prints only original articles, translations, in whole or in part, and reviews, and all original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

What is principally desired is an interesting and valuable paper, and minor corrections are cheerfully made, but the editor, naturally, desires to alter the text as little as possible consistently with good English and a clear expression of the writer's meaning. The more important the reported case, the more brilliant the operation described, the more it behooves the writer to express himself clearly and correctly. Good style does not depend on the multiplication of adjectives and an abundance of parenthetical clauses, but on the use of the simplest and most descriptive words properly linked together in short, grammatical sentences. Accuracy and reasonable brevity usually go together and make for lucidity. It is an excellent practice to write what one has to say *currente calamo* and then to rewrite and eliminate every word which is not absolutely essential to the full exposition of the thought. A great writer and speaker once stated that his style was derived from a study of the English Bible and of Shakespeare. The King James Version of the Bible is unrivaled in our literature for simplicity and clearness, and because of that simplicity and clearness it has done more to establish a standard of English usage than any other written work in the language.

It is not to be expected that medical writers shall rival those who make literature their business, but with a little practice and patience and by rereading his manuscript in cold blood, when it has reposed in his desk for two or three days after the ardor of composition has died out, every graduate of a class A medical school should be able to compose a readable report of his investigations, operations, interesting cases, etc. A very common defect is the constant repetition of some particular word. Not long ago there came to my notice a short article of considerable intrinsic value in which the word "case" or "cases" occurred one hundred and fifty times. The writer was so full of the vital interest of his subject that by this far-from-criminal carelessness he produced a nauseating effect upon the reader. The occasional substitution for "case" of "the patient," "the sick man," "this man," "he" would scarcely have taxed his abilities unduly and the author would then have had a vehicle worthy of what he had to convey.

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